Islamic University of Gaza
Deanery of Graduate Studies
Faculty of Commerce
Department of Business Administration

An Improved SMS User Interface System to Support University Services

(A Case Study on Islamic University of Gaza "**IUG**")

Prepared by

Mohammad Ibrahim Al Sheikh Eid

Supervised by

Prof. Dr. Yousif Hussain Ashour

A DISSERTATION

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

MBA

October, 2011

ABSTRACT

Research Title: An Improved SMS User Interface System to Support University Services (A Case study On Islamic University of Gaza "IUG")

Mobile phones hold great potential to become a common way of conducting services transactions on a global scale in the near future. Text messaging represents an opportunistic agent for the mutual exchange of information between the administrative sector of university and students.

The prototype of SMS User Interface System outlined in this research enables students to access their academic services (such as their study schedules, assessment performance, and institution's provision of information to students) irrespective of geographical location, it is also provide academic information as soon as they become available. This is done by pushing information to the students (sending it to their phones) or working on a request sent from a student to produce the answer (pulling). This application can either be used to push or pull messages.

The researcher conducted a case study on Islamic University of Gaza (IUG) for the study. A random sample of undergraduate students from different colleges and different educational levels were asked to fill a questionnaire. (The questionnaire was distributed in Arabic language). The questionnaire distributed in May, 2011 equal 1200 and 1188 questionnaires fit for study was obtained. SMS User Interface System reduced the need for students to access university or home computer systems to find subject timetables and locations, assessment schedules and feedback or marks.

The findings from the data analysis clearly indicate that students' approval of communication between themselves and academic services through SMSs. Students were pleased, and/or pleasantly surprised to receive. They also indicate the suitability and reliability of SMS communication in instances where up-to date cell phone numbers are available. Students have also found it to be useful, beneficial, efficient and convenient since it achieves their major aim. The research presented here has tentatively indicated that the use of SMS User Interface System in the higher education sector would potentially improve student administrative service.

ملخص الرسالة

عنوان الرسالة :

"تطبيق استخدام رسائل الهاتف الخلوي– SMS المعدل لدعم الخدمات الجامعية"
(دراسة حالة على الجامعة الاسلامية – غزة)

تهدف هذه الدراسة إلى القاء الضوء على احد الصيغ التعليمية الجديدة التي صاحبت التقدم الهائل فى وسائل الاتصال خاصة اللاسلكية منها، والتي تعتمد على استخدام تقنية الهاتف الخلوي وتوظيفها لخدمة العملية التعليمية، من خلال محاولة التعرف على المفهوم ، والآليات أو التقنيات المستخدمة في ذلك، الفوائد المرجوة، والتحديات أو الصعوبات التي تواجه استخدامه، وتقديم بعض المقترحات للتغلب على ذلك.

حيث تسعى هذه الدراسة إلى إتاحة جميع الخدمات الجامعية (تسجيل مساق, سحب مساق, درجة مساق, المعدل التراكمي ,مواعيد المحاضرات و غير ذلك..) لتتم من خلال الهاتف الخلوي وهي خدمة إضافية تمكن الطلاب من ارسال الطلب في أي وقت و من أي مكان وتعتبر هذه الخدمة مساعدة ومكمله لخدمه التسجيل عن طريق الانترنت .

أجرى الباحث دراسة حالة على الجامعة الإسلامية في غزة (**IUG**) حيث تم جمع البيانات من خلال استبانة تم تصميمها لهذا الغرض, حيث تم توزيع 1200 استبانة على مجتمع الدراسة تشمل كليات مختلفة ومستويات تعليمية مختلفة (تم توزيع الاستبيان باللغة العربية) بنسبة استرداد 99%.

حيث أظهرت هذه الدراسة أن الهاتف الخلوي هو أكثر الأجهزة التكنولوجية استخداماً بين الطلاب و أن خدماته يمكن أن تساعد الجامعات و المؤسسات التعليمية في فلسطين على تحسين مستوى الخدمة المقدمة إلى الطلاب وذلك بإتاحة جميع الخدمات الجامعية لتتم من خلال خدمة الرسائل النصية القصيرة.

النتائج المستخلصة من تحليل البيانات تشير بوضوح إلى رضا الطلاب لاستخدام رسائل الهاتف الخلوي – SMS لدعم الخدمات الجامعية لما له من اثر واضح في توفير الوقت و الجهد.ولقد شددت الدراسة على ضرورة استفادة الجامعات الفلسطينية من هذه التجربة من خلال مراعاة ظروف الطلاب وتجاوز حدود الزمان والمكان.

ACKNOWLEDGEMENTS

By the Name of Allah, the Most Gracious and the Most Merciful

First, I would like to express my appreciation to Allah, the Most Gracious and the Most Merciful, and the Most Compassionate who has granted me the ability and willing to start and complete this dissertation.

My most profound thankfulness goes to my supervisor Prof. Dr. Yousif Ashour, Professor of Operations Research at Islamic University in Gaza, for his constant support, guidance, and knowledge as well as his unending patience. I am gratefully and deeply thank him for his support and cooperation as being equipped to provide his best help. Without such kind of support and supervision the emergence of this dissertation would have been next to impossible. My thanks also go to all the lecturers who helped me to collect my data during their classes. ”May Allah bless all of them”.

Special thanks to those noble people who helped me during data collection stage and validation stage. My demonstrative appreciations are to all my friends, my job colleagues in Jawwal Company and everyone who put the hand either directly or indirectly to complete this dissertation.

Last and least, I wish to thank all my dearest family member, especially my parents, my lovely brothers and sisters. The deepest appreciation is expressed to my wife, for her silent sacrifice and endless support throughout this long journey as a graduate student.

DEDICATION

TO MY MOTHER SOUL, TO MY DEAR FATHER . . .

WITH LOVE AND APPRECIATION

TO THE FUTURE OF PALESTINE . . .

MY DAUGHTER's. . .

HAJAR & SARA

TABLE OF CONTENT

CHAPTER FOUR METHODOLOGY

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATIONS

1G	The first generation of mobile telephony systems
2.5G	It extends 2G of mobile telephony systems
2G	The second generation of mobile telephony systems
3.5G	It extends 3G of mobile telephony systems
3G	Third generation technology
4G	Fourth generation mobile technology
AC	Alternating Current
AT Command	Commands were standardized at some point in time
BA.	Bachelor's degree
CDMA	Code Division Multiple Access
CEPT	Conference of European Posts and Telegraphs
CIMD	Computer Interface to Message Distribution
CRM	Customer Relationship Management
EDGE	Enhanced Data Rates for GSM Evolution
EFL Classroom	English For Learning classroom
ETSI	European Telecommunications Standards Institute
EV-DO	3G high speed wireless broadband standard
Gbit/s	Giga bit per Second

GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
HSPA	High Speed Packet Access
HTTP	Hyper Text Transfer Protocol
ID	Identity Document
IMT-Advanced	International Mobile Telecommunications Advanced)
IP	Internet Protocol
ISDN	Integrated Services Digital Network
IT	Information technology
ITU	International Telecommunication Union
IUG	Islamic University Of Gaza - Palestine, Gaza.
KDD	Knowledge Discovery and Data Mining
LTE	Long Term Evolution
MA.	Master degree
Mbit/s	Mega bit per second
MMS	Multimedia Messaging Service
MO	Mobile Orientated
MT	Mobile Terminated
NeXS	NTU eXpress SMS
NTU	Nanyang Technological University

OTP	One Time Password
PDU	Protocol Description Unit
PIF	Palestine Investment Fund
Qtel	Qatar Telecom
SIM	Subscriber Identity Module
SMS	Short Message Service
SMSC	Short Message Service Center
SPSS	Statistical Package for the Social Science
TAP	Telecom Application Protocol
TDMA	Time division multiple access
U.S.	United State
UCP	Universal Communications Protocol
UCPE	Universal Communications Protocol/Extended
UNISA	University of South Africa
WAP	Wireless Application Protocol
WCDMA	Wideband Code Division Multiple Access
WiMAX	Worldwide Interoperability for Microwave Access

GLOSSARY OF TERMS

1G	The first Generation of mobile phones was voice oriented analogue mobile and cordless telephones which were not suitable for modern mobile commerce services.
2.5G	2.5G extends 2G systems, adding features such as packet-switched connection and enhanced data rates. 2.5G networks include EDGE and GPRS. These networks support WAP, MMS, SMS mobile games, and search and directory.
2G	The second generation of mobile telephony systems uses digital encoding. 2G networks support high bit rate voice, limited data communications and different levels of encryption. 2G networks include GSM, and CDMA. 2G networks can support SMS applications.
3G	The third generation of mobile systems provides high-speed data transmissions of 144Kbps and higher. 3G will support multimedia applications such as full-motion video, video conferencing and Internet access.
4G	Fourth Generation of GSM networks is the future scenario of mobile networks that will replace 3G. It will provide unique capabilities to mobile users.
AT Command	Some call it "Attention Telephone", whereas others interpret it as "Attention Terminal" commands. AT commands allow giving instructions to both mobile devices and ordinary landline telephones. The commands are sent to the phone's modem, which can be a GSM modem or PC modem. It can be used for operations that are usually done from the keypad, for instance calling a number, sending, reading, or deleting an SMS, setting the SMSC number, looking for a GPRS access point, reading and deleting phonebook data, reading the battery status, reading the signal strength, and so on.

CDMA	CDMA (Code-Division Multiple Access) refers to any of several protocols used in so-called second generation (2G) and third-generation (3G) wireless communications. As the term implies, CDMA is a form of multiplexing, which allows numerous signals to occupy a single transmission channel, optimizing the use of available bandwidth. The technology is used in ultra-high-frequency (UHF) cellular telephone systems in the 800-MHz and 1.9-GHz bands.
Cellular Operator	Represent the telecommunication company which provides mobile services.
CRM	CRM (customer relationship management) is an information industry term for methodologies, software, and usually Internet capabilities that help an enterprise manage customer relationships in an organized way. For example, an enterprise might build a database about its customers that described relationships in sufficient detail so that management, salespeople, people providing service, and perhaps the customer directly could access information, match customer needs with product plans and offerings, remind customers of service requirements, know what other products a customer had purchased, and so...
EDGE	EDGE allows higher data transmission speeds based on the GSM standard. This system is sometimes referred to as “2.5G”, to denote a halfway house between the GPRS-enhanced GSM technology and UMTS. Thanks to improved coding, data rates of up to 48,000 bits per channel are possible with EDGE. The acronym E-GPRS, also frequently used, stands for "Enhanced GPRS" = enhancement of the GPRS standard. When EDGE and GPRS are combined, data rates of up to 384 kilobits per second are possible.
ETSI	The European Telecommunications Standards Institute (ETSI) is an independent, non-profit, standardization organization in the telecommunications industry

EV-DO	EVDO, also known as EV-DO, 1xEvDO and 1xEV-DO, is a standard for high speed wireless broadband. The acronym is short for "Evolution, Data Only" or "Evolution, Data Optimized". The official name, defined by the Telecommunication Industry Association, is "CDMA2000, High Rate Packet Data Air Interface". It is one of two major Third Generation, or 3G, wireless standards. The competing standard is known as W-CDMA.
GPRS	GPRS is a radio technology for GSM networks that adds packet-switching protocols. As a 2.5G technology, GPRS enables high-speed wireless Internet and other data communications. GPRS networks can deliver SMS, MMS, email, games and WAP applications.
GSM	Abbreviation for Global System for Mobile Communications. The uniform GSM standard ensures perfect compatibility between networks and mobile phones in any location. For example, a user in Switzerland can use his mobile phone to call or receive calls from Germany or Spain. The abbreviation originally stood for "Group Special Mobile", which was the name of the study group that developed a European standard for mobile networks in 1982. Today, this network is the result of their work - the standard for digital mobile telephony (now used all over the world). See UMTS.
HSPA	an amalgamation of two mobile telephony protocols, High Speed Downlink Packet Access (HSDPA) and High Speed Uplink Packet Access (HSUPA), that extends and improves the performance of existing WCDMA protocols.
HTTP	Is the set of rules for transferring files (text, graphic images, sound, video, and other multimedia files) on the World Wide Web. As soon as a Web user opens their Web browser, the user is indirectly making use of HTTP. HTTP is an application protocol that runs on top of the TCP/IP suite of protocols (the foundation protocols for the Internet).

IP	Is a numerical label assigned to each device (e.g., computer, printer) participating in a computer network that uses the Internet Protocol for communication. An IP address serves two principal functions: host or network interface identification and location addressing. Its role has been characterized as follows: "A name indicates what we seek. An address indicates where it is. A route indicates how to get there."
ISDN	Integrated Service Digital Network, or ISDN, is the original high-speed internet service. It sparked the high-speed internet development between service providers during the 1990's and, of course, revolutionized internet use. Much like its predecessor, the dial-up internet service, ISDN utilizes a phone line. In fact, it set the standard for telephone data service
ITU	an agency of the United Nations (UN) whose purpose is to coordinate telecommunication operations and services throughout the world. Originally founded in 1865, as the International Telegraph Union, the ITU is the oldest existing international organization. ITU headquarters are in Geneva, Switzerland.
LTE	LTE, or Long Term Evolution, is a a 4th generation (4G) mobile broadband standard and is aimed to be the successor to the 3G technologies GSM/UMTS. It is currently in development and is considered the competitor to WiMAX.
MMS	Multimedia Messaging is based on the same principle as conventional SMS. Compared with the SMS, which is restricted to a maximum of 160 text characters and cannot exceed 160 bytes, up to 100 kilobytes of different types of data, such as text, short tunes, pictures, photos or brief video sequences, can be transmitted with MMS.
Mobile Users	Represent all active subscriptions or SIM cards used by subscribers. One subscriber can have multi-active subscriptions.
PC	Personal Computer.

PDU	Protocol Description Unit is one way of sending and receiving SMS messages. PDU string contains not only the message, but also a lot of meta-information about the sender, his SMS service center, time stamp.
Service Provider (Carrier)	A company that provides telephone (or another communications) service.
SIM	Subscriber Identity Module. It is an electronic chip contains subscription data and inserted in the mobile handset.
SPSS	SPSS (originally, Statistical Package for the Social Sciences) is a computer program used for statistical analysis.
TDMA	Stands for Time Division Multiple Access, is a cell phone standard that has been incorporated into the more advanced GSM standard, which is now the world's most widely used cell phone technology. TDMA is used in 2G cell phone systems such as GSM. Most major third-generation (3G) cell phone systems are primarily based upon GSM rival CDMA. 3G allows for faster data speeds over 2G.
UMTS	Universal Mobile Telecommunications System; the European entrant for 3G; now subsumed into the 3G family as the WCDMA technology.
UPS	An uninterruptible power supply (UPS) is a device that allows your computer to keep running for at least a short time when the primary power source is lost. It also provides protection from power surges. A UPS contains a battery that "kicks in" when the device senses a loss of power from the primary source.
WAP	Wireless Access Protocol (WAP) is an open international standard for application-layer network communications in a wireless-communication environment. Most use of WAP involves accessing the mobile web from a mobile phone or from a PDA.

WCDMA	Type of 3G cellular network. W-CDMA is the technology behind the 3G UMTS standard and is allied with the 2G GSM standard with the International Telecommunication Union - ITU. Technically WCDMA is a wideband spread-spectrum 3G mobile telecommunication air interface that utilizes code division multiple access (or CDMA the general multiplexing scheme, not to be confused with CDMA the US standard).
WiMAX	WiMAX is an IP based, wireless broadband access technology that provides performance similar to 802.11/Wi-Fi networks with the coverage and QOS (quality of service) of cellular networks. WiMAX is also an acronym meaning "Worldwide Interoperability for Microwave Access (WiMAX).

CHAPTER ONE
INTRODUCTION

This chapter consists of the following sections:

1.1 Introduction

1.2 Problem Statement

1.3 Research Objectives

1.4. Research Methodology

1.5 Research Hypothesis

1.6 Research Phases

1.7 Scope of Study

1.8 Significance of Study

CHAPTER ONE
INTRODUCTION

1.1 Introduction

Since the earlier ages of using technology, the inventors and scientist were always trying to create methods and develop techniques in order to achieve the most flexible and easiest ever life for humanity. Computers with the power of the internet have succeeded in aiding communication among people.

Nowadays the wireless technology considered as one of the most important and common technologies which can be used in several applications. One of those application is the mobile technology which occupies a wide area of our daily life since it is very rarely to find any person who does not own a mobile; more over the mobile devices are considered as a very flexible devices since they are easy to use and to be carried out everywhere by the users (Alomari, 2008).

Mobile technology application can be differentiated by two underlying technology platforms: wireless web-based technology, such as Wireless Application Protocol (WAP), and text-based technology or Short Message Services (SMS). SMS is a basic and common feature given by cellular operators to users. To use WAP feature, users have to activate General Packet Radio Service (GPRS) facility and they have to use mobile phone which has WAP capability (Awodele *et. al.,* 2009).

With the rapid development of mobile phones, SMS and Multimedia Messaging Service (MMS) are readily available and add to the usefulness of mobile phones. SMS in particular is widely used in communication and, more recently, has been leveraged to provide several services like airline ticketing, banking services, and commercial services. SMS is a mobile technology that allows for sending and receiving text or even binary messages to and from a mobile phone. The relative ease of use of SMS makes it possible for a user to learn how to send SMS easily. More than 160 billion SMSs are exchanged each month in European countries (Mavrakis, 2004).

Of all the applications that have been developed for mobile phones, the most useful and most used is SMS. According to Markett *et. al.,* (2006) SMS has been labeled the killer application of mobile phones as its usage has surpassed all expectations. It is then only natural that SMS is incorporated into mobile learning as it is one of the simplest and most user-friendly applications compared to other mobile technologies (Abas *et. al.*, 2009).

Recently, the growing influence of SMS has attracted significant attention. As a convenient and low-cost mobile communication technology, SMS is experiencing very rapid growth. In 2001, 700 million mobile phone users worldwide sent an average of 20 billion SMS messages every month. Indeed, the volume of SMS messages sent in December 2001 was 30 billion worldwide and it was expected to grow to 100 billion by the end of 2002. In Europe, Norway leads the region with an average of 47 messages sent per month per user in 2001 while Philippines lead the Asia-Pacific region with 336 SMS messages (Siemens, 2001), and according to Resource Shelf (2006), 48.7 billion SMS messages were sent in the second half of 2005, which is up 50% from the six months before that (Pramsane & Sanjaya, 2006).

International Telecommunication Union (ITU) reported that in the year 2010, a total of 6.1 Trillion SMS have been exchanged Worldwide, from 5.3 billion mobile cellular subscriptions worldwide, including 940 million subscriptions to 3G services, which has jumped from 1.8 Trillion SMS in year 2007.That is SMS has leapt three-folds in the past three years, with almost 200,000 text messages exchanged every second (Pakistan Telecommunication Authority, 2010).

In the U.S. alone a teen sends, on average, an SMS message every 10 minutes, according to Nielsen. That's an incredible 3,330 texts each month (Leggatt, 2010).

A study by ABI Research finds that consumers worldwide will send more than 7 trillion SMS messages in 2011, indicating a huge opportunity for marketers (Tsirulnik, 2010).

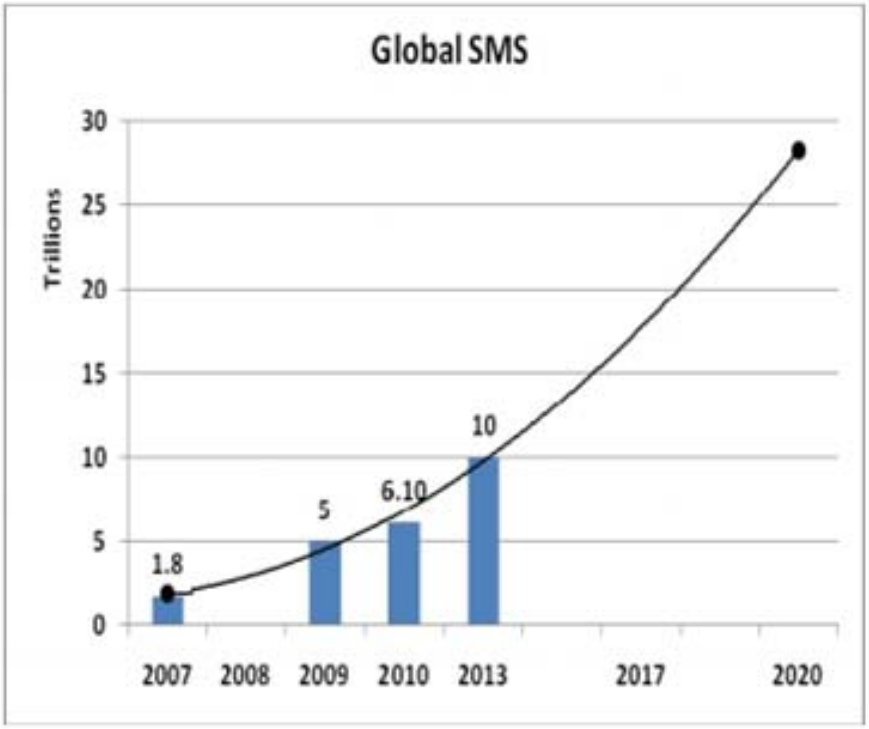


Figure (1.1): The forward prediction of SMS in coming four years [Source Pakistan Telecommunication Authority (2010)]

Research on SMS communication which confirms that SMS communication is quick, efficient, cheap, and convenient and it has been used around the world for different purposes (Nonyongo *et. al.*, 2005).

SMS is increasingly regarded as something of a commodity by users due to falling delivery costs and high competition (Tsirulnik, 2010).

According to Power (2004) deaf people have taken readily to this technology as they now have the same access to phone communication involving SMS communication as do hearing people.

According to Faulkner & Fintan (2005) the effective use of SMS technology in higher education and associated systems is intended to mirror technology already commonly adopted in the social and business arena. SMS use for the purpose of communication is evidenced by the 20.5 billion messages sent in the UK in 2003. The role of SMS communication in universities is not new in the developing world. SMS is one of the students' favorite means of communication with faculty and other students.

Studies of students' use of different forms of communication media show that SMS text messaging is used more regularly than email and is the preferred medium for receiving information from the university (Traxler & Riordan, 2003).

SMS has been used as a stand-alone application in mobile learning as well as in tandem with other applications. The most basic functions are for communication and information delivery and retrieval. It can be used as a push only mechanism (for example, communicating about studies) or as a push and pull mechanism (as when there is interactivity; education providers send out content and learners reply to teaching servers with questions or requests for assistance, which are then converted into data requests) (Abas *et. al.*, 2009).

As for academic support, Markett *et. al.* (2006) reported that learners asked more questions, and more freely at that, in an in-class SMS system while Motiwalla (2007) noted that content delivery is more effective when a combination of push and pull mechanisms are used. This is due to the fact that there is an "expansion of time" in that learners have more time to reflect and react to the information they receive. Another advantage related to academic support is the effectiveness of delivering content in "nuggets" or small chunks that are more easily absorbed as was achieved by the Sheffield Halam University of India for their undergraduate degree programs (Uday Bhaskar & Govindarajulu, 2008).

1.2 Problem Statement

Islamic University of Gaza (IUG) is an independent Palestinian university established in 1978 in Gaza City, Palestinian territories (IUG, 2010). There are almost 18,206 students at IUG including 6,723 male students and 11,4843 female students (IUG, 2011). IUG students face several obstacles, while they are trying to check the university website some of these obstacles are:

- Abnormal electricity.
- Internet service might be unavailable.
- The students can access their information only from the web browser, which is provided by computer, and several high-end mobile phones. Not every mobile phone can access this system and the users must activate the GPRS facility to access the website from mobile phone.
- Because of increasing number of registered students the demand to use registration through web increased may causing downtime for internet gateway are shown in Appendix B.

So the main question that will be addressed in this research is: **What will be the impact of utilizing new way through cellular phone in addition to internet for delivering all university services to the students in an efficient way that may improve student's satisfaction and help them to face these obstacles and save time and efforts?**

1.3 Research Objectives

The main objective of this research is to overcome the problem statement, for that this research is being carried out with several objectives and it is important to state them clearly, to ensure that the research is kept on track.
Following are the objectives of An Improved SMS User Interface to Support University Services.

Prototype:

1. To propose new system architecture for SMS User Interface System to Support University Services at IUG.
2. To build a prototype SMS User Interface System for IUG students.
3. To develop a questionnaire evaluates the acceptance of the SMS User Interface System according to the IUG students view points by the Statistical Package for Social Sciences (SPSS).

1.4. Research Methodology

In order to study the attitudes of IUG students on the effectiveness of An Improved SMS User Interface System, and to accurate the research objectives. IBM is the questionnaire that has been developed to measure student's satisfaction of the prototype. The IBM consists of twenty seven items. It is divided into three sections namely respondent profile, system evaluation and benefits and student satisfaction. All items are measured using ten Likert Scale Format ranging from Strongly Disagree to Strongly Agree.

Students are asked to rate the agreement with the ranging from Strongly Disagree to Strongly Agree. Sample member of the research are all students in IUG. More details about Questionnaires are shown in Appendix A.

The research was conducted in IUG, Gaza Strip, Palestine. The questionnaire distributed equal 1200 and 1188 questionnaires fit for study was obtained.

A random sample of undergraduate female students (N= 648), age range (18 – 25 years and above 26 years), and undergraduate male students (N= 552), age range (18 – 25 years and above 26 years) filled in a questionnaire (the questionnaire was distributed in Arabic language).

All participants were asked to complete a questionnaire which included all types of measuring students' attitudes, evaluation and perceptions on the effectiveness of SMS User Interface System. The questionnaire, including a cover letter, was distributed to participants during the class. All subjects were asked to respond to the questionnaire and their responses were guaranteed confidentiality.

The data of this research was gathered by means of a paper and pencil survey. Respondents of the survey were undergraduate students from different colleges and different educational levels.

The questionnaires were distributed and collected at the end of semester in May, 2011. The data collected was processed and statistically analyzed through SPSS. In our first study on the students' attitude and perception towards the effectiveness of SMS User Interface System in IUG, 97.9% of the students who participated in this survey owned cellular Phone and 91.6% of the students who participated in this survey were aware of SMS service.

The final result of the data analysis according to Descriptive Statistics table indicated the sample members found the system usable and beneficial since it achieves their major aim. Furthermore, a discussion about mobile technologies and their implications for students was included from various literature resources.

Figure (1.2) shows the methodology flowchart, which leads to achieve the research objectives.

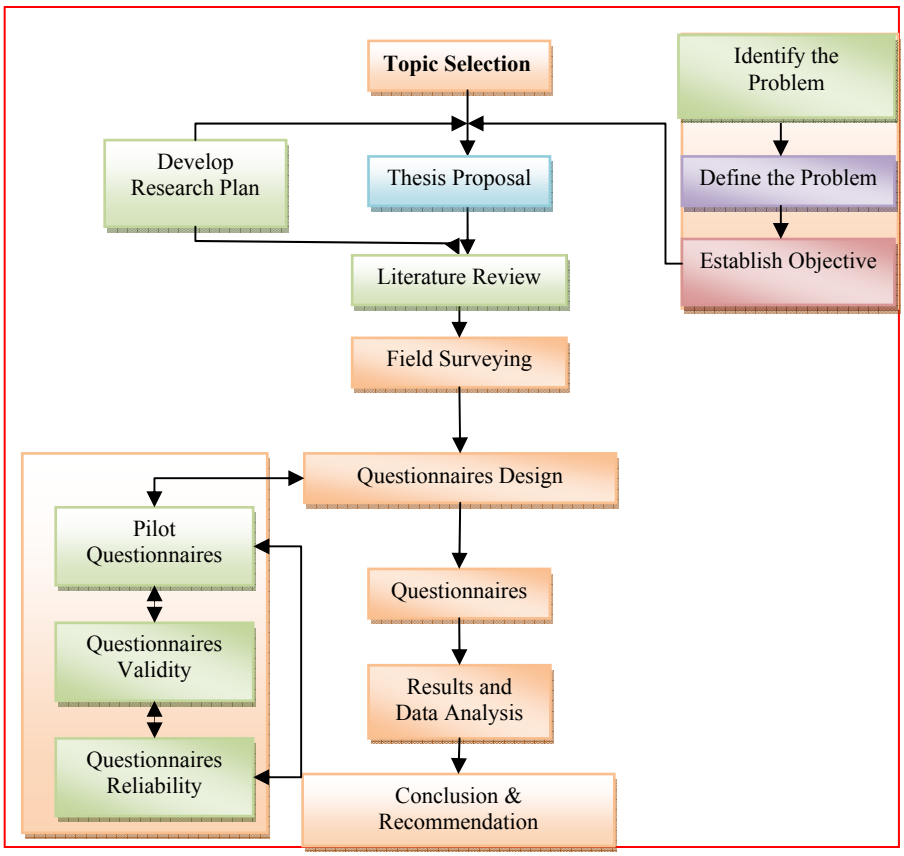


Figure (1.2): Illustrates the methodology flow chart.

1.5 Research Hypothesis

Hypothesis1

An Improved SMS User Interface System to Support University Services Evaluation at significant level $\alpha = 0.05$.

Hypothesis2

Assess benefits and Student Satisfaction for An Improved SMS User Interface System to Support University Services at significant level $\alpha = 0.05$.

Sub Hypothesis:

1. There is a significant differences at level $\alpha = 0.5$ about An Improved SMS User Interface to Support University Services due to sex.
2. There is a significant differences at level $\alpha = 0.05$ about An Improved SMS User Interface to Support University Services due to age.
3. There is a significant differences at level $\alpha = 0.05$ about An Improved SMS User Interface to Support University Services due to residence.
4. There is a significant differences at level $\alpha = 0.05$ about An Improved SMS User Interface to Support University Services due to educational background level.
5. There is a significant differences at level $\alpha = 0.05$ about An Improved SMS User Interface to Support University Services due to Latest facilities.
6. There is a significant differences at level $\alpha = 0.05$ about An Improved SMS User Interface to Support University Services due to average monthly SMS utilization.

1.6 Research Phases

This research consisted of *six* major phases to achieve its objectives. The first phase of the research thesis included identifying and defining the problems, establishment objective and development research plan. The second phase of the research included a summary of the comprehensive literature review. Literatures on claim management were reviewed. The third phase of the research included a field survey which was conducted with An Improved SMS User Interface to Support University Services "Case Study on Islamic University of Gaza (IUG)".

The fourth phase of the research focused on the modification of questionnaire design, through distributing the questionnaire to pilot study, The purpose of the pilot study was to test and prove that the questionnaire questions are clear to be answered in a way that help to achieve the target of the research. The questionnaire was modified based on the results of the pilot study. The fifth phase of the research focused on distributing and analyzing questionnaire. The questionnaire was used to collect the required data in order to achieve the research objective. The final phase includes the conclusions, future works and recommendations.

1.7 Scope of Research

The scope of the research is mainly focused on university services and it is going to be used by students at IUG by using mobile SMS application. This SMS application will use SMS as a way to communicate with all university services by students.

1.8 Significance of Research

The proposed system is expected to help students to communicate with all the university services via their cellular phones. This means that they can access all services even in the remotest locations where internet service might be unavailable, preventing them from accessing the University website. Therefore developing a system help students to face these obstacles is being a must. Also several benefits can be achieved by applying this system, such as save time, save efforts; moreover such system will increase flexibility.

CHAPTER TWO
LITERATURE REVIW

This chapter consists of the following sections:

2.1 Introduction

2.2 Background of Islamic University of Gaza

2.3 Mobile Telecommunication Generations

2.4 GSM History Overview

2.5 GSM Services

2.6 Short Message Service

2.7 SMS Message Center (SMSC)

2.8 Overview of SMS Gateway

2.9 GSM Modem Overview

2.10 Telecom Sector In Palestine Overview

2.11 Previous SMS Studies Overview (Related Work)

CHAPTER TWO
LITERATURE REVIW

2.1 Introduction

The literature review is a critical look at the existing research that is significant to the work being carried out. Some people think that it is a summary: This is not true. Although you need to summarize relevant research, it is also vital that you evaluate this work, show the relationships between different works, and show how it may be related to this work (Bertini, 2005).

The literature review of this research was structured from previous mobile short message services studies for two reasons. First, this structure will provide a broad, yet rich context and history for the proposed research problem from all aspects related to the purposes of this research, and second, it attempts to illustrate why examining this research problem is a necessary research endeavor.

2.2 Background of Islamic University of Gaza

IUG is an independent academic institution located in Gaza. IUG is a home to the well-planned programs, a way to the different community levels and a place for researchers and good teachers. IUG is a member of four associations: International Association of Universities, Community of Mediterranean Universities, Association of Arab Universities and Association of Islamic Universities. Prior to the establishment of the Islamic University, students of Gaza Strip had to seek their higher education in Egypt because Gaza Strip lacked universities by them.

In 1967, it deemed necessary to a group of businessmen to establish a higher education institution in Gaza Strip to serve thousands of students and to help them save their time, money and effort. On that account was the establishment of Islamic University in 1978 starting with three faculties only, IUG developed its facilities and academic

departments to have ten faculties at the moment to offer BA. B.Sc., MA, M.Sc., Diploma and higher diploma in a variety of disciplines (IUG, 2010).

There are almost 18,206 students at IUG including 6,723 male students and 11,4843 female students (IUG, 2011).

True to the IUG vision of being the leading Palestinian university working to develop educational and cultural standards in Palestinian society according to professional Values and Principles, IUG embarked on learning via SMS initiative in an effort to make learning more flexible and ubiquitous for students.

The general objectives of mobile learning are: 1. To enhance the blend of learning modes at IUG; 2. to increase the flexibility offered to IUG students and; 3. to encourage and support ubiquitous learning (just in time, anytime, anywhere) via mobile technologies (IUG, 2010).

IUG mission is to: 1. Provide high quality education to students, particularly those living in Gaza Strip; 2.encourage academic and scientific research to meet the challenges; 3.participate effectively in developing Palestinian community; 4.promote knowledge and professional skills and science advancement (IUG, 2010).

With that in mind and in line, SMS was chosen over other mobile technology applications because it is the lowest common denominator of all mobile technologies: It can be used on all types of mobile phones and students are familiar with receiving SMS's.

This is consistent with the university's philosophy of democratizing education, which means making education available to all. Further, with the high penetration rate of mobile phone subscriptions of people in Palestine, it appeared this was the way to go in making inroads into the use of mobile devices.

2.3 Mobile Telecommunication Generations

The initial release of GSM was called GSM Phase 1 and generally referred to as the 1G (Ajiboye et. al., 2007). This release made provision for the basic voice, SMS and Circuit Switched Data (CSD) (Popoola et. al., 2009).

The Second Generation (2G) systems designed in the 1980s were still used mainly for voice applications but were based on digital technology, including digital signal processing techniques. These 2G systems provided circuit-switched data communication services at a low speed. The competitive rush to design and implement digital systems led again to a variety of different and incompatible standards such as GSM, Time Division Multiple Access(TDMA), Personal Digital Cellular (PDC) and Code Division Multiple Access(CDMA). Third Generation (3G) mobile system would have higher quality voice channels, as well as broadband data capabilities, up to 2 Mbps. An interim step is being taken between 2G and 3G is the 2.5G. It is basically an enhancement of the two major 2G technologies to provide increased capacity on the 2G Radio Frequency (RF) channels and to introduce higher through put for data service, up to 384 kbps (Ibrahim, 2002).

Gleez (2011) indicates that the Fourth Generation (4G) system is expected to provide a comprehensive and secure all-IP based mobile broadband solution to laptop computer wireless modems, smartphones, and other mobile devices, while PRE-4G technologies such as mobile WiMAX and Long term evolution (LTE) have been on the market since 2006 and 2009 respectively, and are often branded as 4G. The current versions of these technologies did not fulfill the original ITU-R requirements of data rates approximately up to 1 Gbit/s for 4G systems. Figure (2.1) summarizes data speeds and possible applications for different mobile generations.

		Real World (avg)		Theoretical (max)		Availability
		Download	Upload	Download	Upload	
2.5G	GPRS	32-48Kbps	15Kbps	114Kbps	20Kbps	Today
2.75G	EDGE	175Kbps	30Kbps	384Kbps	60Kbps	Today
3G	UMTS	226Kbps	30Kbps	384Kbps	64Kbps	Today
	W-CDMA	800Kbps	60Kbps	2Mbps	153Kbps	Today
	EV-DO Rev. A	1Mbps	500Kbps	3.1Mbps	1.8Mbps	Today
	HSPA 3.6	650Kbps	260Kbps	3.6Mbps	348Kbps	Today
	HSPA 7.2	1.4Mbps	700Kbps	7.2Mbps	2Mbps	Today
Pre-4G	WiMAX	3-6Mbps	1Mbps	100Mbps+	56Mbps	Today
	LTE	5-12Mbps	2-5Mbps	100Mbps+	50Mbps	End 2010
	HSPA+	-	-	56Mbps	22Mbps	2011
	HSPA 14	2Mbps	700Kbps	14Mbps	5.7Mbps	Today*
4G	WiMAX 2 (802.16m)	-	-	100Mbps mobile / 1Gbps fixed	60Mbps	2012
	LTE Advanced	-	-	100Mbps mobile / 1Gbps fixed	-	2012+

Figure (2.1): data speeds and possible applications for different mobile generations [Source: Gleez(2011)]

2.4 GSM History Overview

The term GSM stands for Global System for Mobile Communications. A GSM Network is a network used for cellular telephones and supports digital communication for voice and Internet/data services on cell phone networks. Technology updates and regulations for this network are done through the GSM Association. This association represents mobile carriers around the world (Link, 2011).

Chang, & Hou (2009) indicate that the first cellular phones began to appear in 1980, in Europe specifically in Scandinavia, United Kingdom, France, and Germany. In 1989, GSM responsibility was transferred to the European Telecommunication Standards Institute (ETSI), and phase I of the GSM specifications were published in 1990.

Commercial service was started in the mid of 1991, and by 1993 there were 36 GSM networks in 22 countries.

Alomari (2008) indicates that the Europeans realized this early on, and in 1982 the Conference of European Posts and Telegraphs (CEPT) formed a study group called the Groupe Spécial Mobile to study and develop a pan-European public land mobile system. The proposed system had to meet certain criteria. These criteria are: Good subjective speech quality, low terminal and service cost, support for international roaming, ability to support handheld terminals, support for range of new services and facilities, spectral efficiency, and Integrated Services Digital Network (ISDN) compatibility.

Peersman *et. al.,* (1997), describes the main feature of GSM as provision of good speech quality over a whole range of operating conditions, the support of international roaming and the ability to offer many new value added services such as voice mail, call handling facilities, call line identification and SMS.

ICT (2010) indicates that by the end of 2010, there will be an estimated 5.3 billion mobile cellular subscriptions worldwide, including 940 million subscriptions to 3G services. Also access to mobile networks is now available to 90% of the world population and 80% of the population living in rural areas.

Mobile subscribers have grown from less than 500 million subscribers in 1999 to well over 5 billion worldwide in year 2011 (Wood, 2011).

While the original GSM technology was created strictly for voice and text messaging, today's new generation of the network continues to move technology forward. The developments include expansion into video on the cellular device and users gaining the ability to use multiple channels on the same network. This will give the customers a stronger signal and better coverage, so the future of the GSM network looks pretty bright, as its growth in market share exceeds all expectations.

2.5 GSM Services

GSM is an open standard for services, infrastructure and communication independent of the individual countries, network operators and producers are flexible to the requirements of the individual user (Almoari, 2008).

GSM services are a standard collection of applications and features available to mobile phone subscribers all over the world. The common standard makes it possible to use the same phones with different companies' services, or even roam into different countries (Eberspacher *et. al.*, 2009).

The design of the service is moderately complex because it must be able to locate a moving phone anywhere in the world, and accommodate the relatively small battery capacity, limited input/output capabilities, and weak radio transmitters on mobile devices.

Features like caller identification, call forwarding waiting, multiparty conversations, and barring of outgoing calls are provided as supplementary service, which is on the teleservices or bearer services (Malick, 2003).

2.6 Short Message Service

The Short Message Service (SMS) is arguably the most popular data service over cellular networks nowadays. A mobile device allowing sending and receiving text or binary messages between mobile phones. Users can make of it to send person to person messaging, email notifications, information services, and alerts and so on (Zerfos *et. al.*, 2006).

SMS was included in the GSM standards right at the beginning. Later it was ported to wireless technologies like code division multiple access (CDMA) and Time division multiple access (TDMA). The GSM and SMS standards were originally developed by ETSI. SMS called short because it is about (100- 200 character in length), it contains only text (Alomari, 2008).

SMS text messaging supports language internationally. It works fine with all languages supported by Unicode, including Arabic, Chinese, Japanese and Korean (Developershome, 2011).

According to BBC (2002) The first SMS message was sent over the Vodafone GSM network in the United Kingdom on 3 December 1992, from Neil Papworth of Sema Group (now Airwide Solutions) using a personal computer to Richard Jarvis of Vodafone using an Orbitel 901 handset. The text of the message was **"Merry Christmas".**

The SMS is a service for sending message can contain up to 160 characters to mobile phones that use GSM communication. These messages are comprise of words, numbers or an alphanumeric combination. SMS messages do not require the mobile phone to be active and within range, as they will be held for a number of days until the phone is active and within range. SMS are transmitted within the same cell or to anyone with roaming capability. The SMS is a store and forward service, and is not sent directly but delivered via an SMS Center (SMSC) (Alomari, 2008).

Sachpazidis *et. al.*, (2004), point out that SMS is typically used to carry different types of information one of these is students at the university to get their result of their exams, Etc.

Any thing is capable of talking to a GSM network, has the ability to send and recive SMS messages. Cellular phone are not the only devices to send and recive SMS messages. SMS messages is the most obvious and effictive way to provide notification (Halse& Wells, 2002).

International Telecommunication Union (ITU) reported that in the year 2010, a total of 6.1 Trillion SMS have been exchanged worldwide, from 5.3 billion mobile cellular subscriptions worldwide, including 940 million subscriptions to 3G services, which has jumped from 1.8 Trillion SMS in year 2007. That is SMS has leapt three-folds in the past

three years, with almost 200,000 text messages exchanged every second (Pakistan Telecommunication Authority,2010).

According to Pakistan Telecommunication Authority (2010), around the world, SMS is used by four billion mobile users, who sent five trillion messages in 2009 i.e. approximately 105 SMS per person per month. By year 2013 the volume of messages will double to 10 trillion, the SMS traffic will grow double in coming four years. Much of the consistent growth of SMS is due to its ever-widening adoption beyond peer-to-peer messaging, such as banking, social networking, enterprise applications, advertising and machine-to-machine communication.

For instance, Juniper Research recently revealed that global mobile banking services will be generating 90 billion text messages per annum by 2015, as banks seek to utilize SMS as a means of enhancing customer communications and services. The forward prediction can be seen in Figure (2.2).

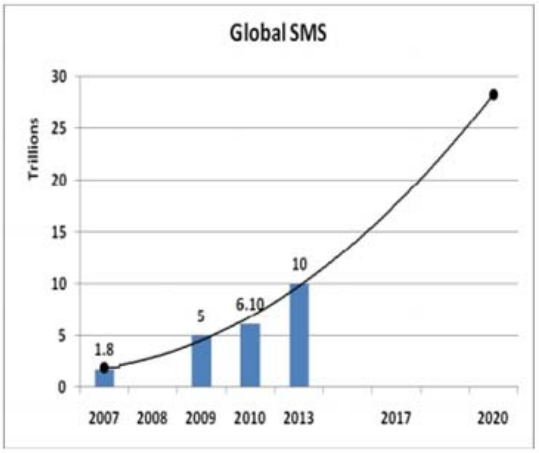


Figure (2.2): The forward prediction of SMS in coming four years [Source Pakistan Telecommunication Authority (2010)]

2.7 SMS Message Center (SMSC)

When a user sends a text message (SMS message) to another user, the message gets stored in the SMSC which delivers it to the destination user when they are available. SMSC is responsible for handling the SMS operations of a wireless network.

According to Developers Home (2010), the steps of delivering SMS message are as follow:

1. When an SMS message is sent from a mobile phone, it will reach an SMS center first.
2. The SMS center then forwards the SMS message towards the destination.
3. The main duty of an SMSC is to route SMS messages and regulate the process. If the recipient is unavailable (for example, when the mobile phone is switched off), the SMSC will store the SMS message.
4. It will forward the SMS message when the recipient is available.

The SMSC is software that resides in the operators network and manages the process including queuing the messages, billing the sender and returning receipts if necessary (Calsoftlabs, 2010).

2.8 Overview of SMS Gateway

SMS Gateway is messaging software for sending messages to GSM mobile phones and pagers. It offers a numbers of features including defining custom gateways. SMS is the name for message transmission between GSM subscribers (Nordic, 2011).

SMS Gateway for Business is the ideal solution for IT Professionals extending their network and system monitoring with SMS alarm functionality (Zonith, 2006).

According to Zonith (2006), said that the SMS Gateway is ideal for integration with existing business systems and due to many flexible interfaces in SMS Gateway the integration with mail programs, monitoring systems, Customer Relationship Management (CRM) systems or similar becomes very easy.

SMS gateway supports the following gateway to SMSC protocols Universal Communications Protocol (ERMES/UCP), Ericsson's implementation of UCPE (UCP/Extended), Computer Interface to Message Distribution (CIMD), Telecom Application Protocol (TAP) and THS (Nordic, 2007).

SMS Gateway is a solution for application developers and content providers to gain access to the clients of mobile operators, enabling to send and receive SMS (Mobisolutions, 2007).

SMS Gateways are centered on convenience, flexibility, and continuous integration of messaging services and data access. SMS Gateway is software utility that enables you to easily send and receive SMS over GSM cellular telephone networks from your local PC or through the network (Visualtron, 2008)

According to Ozeki (2008), The Ozeki NG - SMS Gateway has been designed to help enterprises facing several unique communication challenges: the proliferation of electronic messages across their enterprise; the need to provide employees, customers, and partners with consistent information; the desire to better equip information workers with meaningful information to drive informed decisions; and the mandate to control costs without sacrificing application availability, security, or reliability.

The Ozeki NG - SMS Gateway is a software product that will help maximize the productivity of Information technology (IT) by reducing the complexity of creating, deploying, and managing mobile communication applications. It empowers developers through a rich, flexible, modern development environment for creating secure, high performance solutions based on the SMS technology (Ozeki, 2008).

The SMS Gateway enables the sending and receiving of SMS between the internet and mobile phones; using web browsers, email and HTTP interface (Kapow, 2008).

The Ozeki NG-SMS Gateway is a software product that will help maximize the productivity of IT by reducing the complexity of creating, deploying and managing mobile communication applications (Ozeki, 2010).

2.9 GSM Modem Overview

A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves. Like a GSM mobile phone, a GSM modem requires a Subscriber Identity Module (SIM) card from a wireless carrier in order to operate. The number of SMS messages that can be processed by a GSM modem per minute is very low -- only about six to ten SMS messages per minute (Developershome, 2010).

In general, a GSM/GPRS modem is recommended for use with a computer to send and receive messages. This is because some mobile phones have certain limitations comparing to GSM modems. Some of the limitations are described below:

1. Some mobile phone models (example: Ericsson R380) cannot be used with a computer to receive concatenated SMS messages.
2. Many mobile phone models cannot be used with a computer to receive MMS messages. Because when they receive a MMS notification, they handle it automatically instead of forwarding it to the computer.
3. A mobile phone may not support some AT commands, command parameters and parameter values.
4. Most SMS messaging applications have to be available 24 hours a day.
5. However, some mobile phone models cannot operate with the battery removed even when an AC adaptor is connected, which means the battery will be charged 24 hours a day.

2.10 Telecom Sector in Palestine Overview

Palestine Cellular Telecommunications Company (JAWWAL) was the first operator in the Palestinian territories and currently operating GSM/2.5G network and started its commercial launch on August 1999 (Astal, 2008).

Wataniya Mobile launched in November 2009, a new mobile company that aims to be the communications leader of choice, and is committed to provide an excellent customer experience and service (Wataniya, 2010).

The two Palestinian operators registered solid growth during 2010's first half. Jawwal started the year with 1.784 million subscribers and added 287,610 subscribers to reach a total of 2.07 million by end of June 2010. Wataniya Mobile reported reaching a subscriber base of 243,000 lines by end of June 2010 since its commercial launch in November 10, 2009. Israeli operators' market share dropped to an estimated 8.4% by end of June 2010. Figure (2.3) below explains further (Sakkijha, 2010).

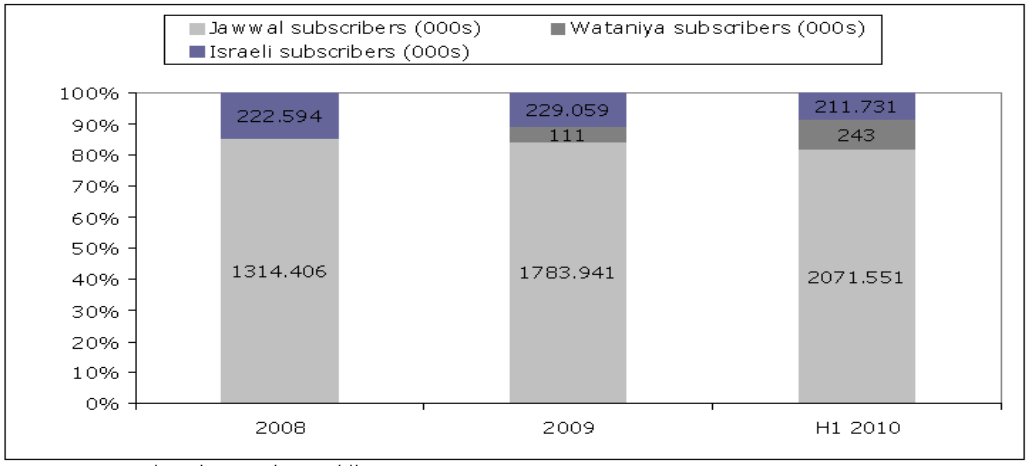


Figure (2.3): Total number of Mobile Operators subscribers in Palestine [Source: Sakkijha (2010)]

2.11 Previous SMS Studies Overview (Related Work)

The complete system for SMS Gateway Interface System can be setup for many applications. Some of the examples are Smart Home System and Remote Data Collection System (Sang *et. al.*, 2003)

The study of Sachpazidis *et. al.*, (2004) in Germany titled "*Medication Adherence System using SMS technology"* is used to remind the patient to take his tablets. The system sends SMS to the patients on a specific time according to the medication timetable defined by their physician. The default content of the SMS is the following: *"Medication Reminder: Your next dose is now due. Please confirm you have taken it by replying to this message"*. The server is waiting to receive the patient's reply for about 20 min. if no reply, the server resends the reminding SMS message to the patient. That happens twice in case of the patient not replied. The message can be modified by the monitoring physician. Finally, the server treats the event as "*missed dose event*" if no reply has been received in total of 2 hours.

The study of Nonyongo *et. al.*,(2004) in South Africa titled "*Effectiveness of SMS Communication between University and Students"* shows that university of South Africa (UNISA) conducted a research aims to investigate whether and how SMS can be used to improve communication with and/or provide support to students enrolled for the diploma in youth development at UNISA and to explore the possibility of using SMS as an alternative means of communicating. A survey of students at UNISA , who are enrolled for the diploma in youth development during the 2nd semester of 2004 was made. In the methodology of research, questionnaire was developed and how ever sent to all those students. SMS was sent to inform students on the due date of their examination results and the closing date for the 2005 first semester registration. The results clearly indicate student's approval of the communication between themselves and UNISA through SMS. The students indicate the suitability and reliability of SMS communication in instances where up to date cell phone numbers are available, also they have found it as an efficient and convenient.

The study of Jayaraman & Huggard (2005) in Malaysia titled as "Library SMS Services" is the system proposed in the Monash University to enable Monash Library to send SMS notification of library book-dues notices and fines notices to student's mobile phones. Instant Notification of item available, item due and fine notices to students by means of SMS technology. The findings indicate that the service was very popular, 97% of users were satisfied and there is a positive effect on user behavior (so it must be relevant).

The study of lingo (2005) in Singapore titled as "*SMS to Get Your Exam Results*" show that NeXS (NTU eXpress SMS) is used at the Nanyang Technological University (NTU). To use NeXS the user needs to be an undergraduate student of NTU and needs to register his/her mobile phone on the NeXS Portal. NeXS accepts numbers from three mobile providers (Singtel/Starhub/M1). Once a mobile phone is registered, the student can use the phone to send SMS and access information. However, students can only use the mobile number that was registered. To get exam results via NeXS, users send the keyword NTU RESULT to 74000. If the exam results of the current semester are released, NeXS will respond with the reply. Besides accessing exam results via NeXS, there are other services that can be accessed via SMS: Examination result, Examination seating arrangements, Subject timetable, Library account information, Check availability of sports facilities, Book sports facilities, Cancel booking of sports facilities and NTU Staff Directory Search.The strength of NeXS is that it offers a form of security by ensuring that only the registered mobile phone can request the result.

The study of Philip (2006) in Kuwait titled "*Mobile Banking in Kuwait and Customers perceptions regarding usage of Mobile Banking Services*", aimed to study and analyze different perceptions of customers for using Mobile Banking services. The study found that the primary reasons customers use M-Banking are: convenience, accessing banking services 'anywhere, anytime', alerts to banks promotions on new products/services and control of account movements. The most important reason was the ability to access banking services 'anywhere, anytime' followed by convenience. The study concluded that M-Banking service providers should understand the personal needs of their clients in order to provide value added services.

The paper of Kajumbula (2006) in Uganda titled "*The effectiveness of mobile short messaging service (SMS) technologies in the support of selected distance education students of Makerere University, Uganda"* reports the results of an exploratory study undertaken to test the effectiveness of SMS among selected first year Bachelor of Commerce External upcountry Distance Education students in Makerere university. It is proposed that these results and their findings can inform more effective future usage of mobile technologies in Distance Education in Uganda. Using a questionnaire on a cluster sample of the students, and an interview guide on a purposively selected sample of tutors and administrators, SMS communication was found to be more effective in conveying information about upcoming programs and developments at the main campus. Students were enthusiastic about it.

The study of Harley *et. al.,* (2007) titled *"Using texting to support students' transition to university"* argues that judicious use of mobile phone text messaging by university staff has the potential to enhance the support provided to students by an academic department during the transition to university. It reports on an evaluation of a desktop computer application, which enables staff to send text messages from their computers to the mobile phones of groups of students. Analysis of qualitative interviews with 30 students reveals that SMS is the dominant mode of electronic communication amongst students and plays a central role in maintaining their social networks. The SMS dialogue amongst students provides emotional and social peer support and facilitates an informal system of interdependent learning in relation to navigating unfamiliar academic and administrative systems. Text messages from university staff, inserted into this dialogue, can enhance the existing peer support and aid students' social integration into university life.

The study of Rotimi *et. al.,* (2007) in Nigeria titled as "*SMS Banking Services: A 21st Century Innovation in Banking Technology"* is an interactive SMS Banking Agent that is incrementally scalable for banking operations. This system is an interactive SMS Banking Agent which receives the text messages from the clients, processes them and sends the output back to the users when applicable. The proposed system solves all the problems identified in the existing systems. SMS banking is a mobile technology that allows client to request and receive banking information from his bank on his mobile phone via SMS. Clients were enthusiastic about it.

The case of Desi (2008) in Orissa titled "*Check Orissa HSC exam results 2008/Board of Secondary Education*", explained that the Board of Secondary Education in Orissa makes the HSC exam result available via SMS. The examination result is requested by sending the SMS Code: HSCR Roll No (for regular/regular Correspondence Courses) and HSCX Roll-No (for Ex-regular/Ex-regular Correspondence Courses) to 56505.

The paper of Awodele *et. al.,* (2009) titled "*An Improved SMS User Interface Result Checking System"*, stated that the checking of MUET Result via SMS is also another example of SMS result checking. The system receives SMS in the format MUET <space> IC Number, sent to 39003. The service charges 15 cents for each message sent and 30 cents for each received. The findings indicate that the students were satisfied and there is a positive effect on their behavior.

The study of Brett & Paul (2011) in England titled as "*Students' experiences and engagement with SMS for learning in Higher Education"* presents an evaluation of students' experiences and engagement with SMS. SMS was used to support learning through engaging students in formative assessment objective questions with feedback, as well as SMS-based collaborative learning tasks. Students' experiences and engagement were investigated through qualitative and quantitative data. Findings showed experiences and engagement to be mixed, the quantitative data differing somewhat from the qualitative. Positive experiences were reported for administrative communications, learning support and suggested uses for student. Negative factors in students' experiences were: intrusion

into personal time; the culture of immediacy in texting; costs; and lack of perceived pedagogic benefit

The study of Zhang *et. al.,* (2011) in China titled *"Reexamining the Effectiveness of Vocabulary Learning via Mobile"* reexamined the effectiveness of vocabulary learning via mobile phones. Students (N=78) from two intact classes of sophomores at a Chinese university were assigned to two groups: the SMS group (the experimental group) and the paper group (the control group). Then, they were administered a pretest to identify the level of their prior vocabulary knowledge. The results revealed that there was no significant difference ($p>.05$) between the SMS group (Mean=33.34, SD=14.30) and the paper group (Mean=37.13, SD=15.21). Next, they were put into two intervention conditions. The SMS group studied a selected list of vocabulary via mobile phone SMS text messages while the paper group worked on the same list of vocabulary through paper material in a self-regulated manner. Results showed that there was a significant difference ($p<.05$) in the posttests but not in the delayed tests ($p>.05$) between the two groups. The study concludes that vocabulary learning through these two methods is effective in their own way and that a blended approach to vocabulary learning may better help increase the effectiveness from the perspective of sustained retention rates.

The study of Tiwari & Buse (2011) in Germany titled "*The mobile commerce prospects: A strategic Analysis of opportunities in the banking sector*", was based on objective and statistical approach and aimed to analyze the opportunities of using mobile banking services in Germany. The researcher distributed two questionnaires, one for banking customers and the other for banks as to study the potential of M-Banking in Germany. The study found that M-Banking seems to possess the potential to become one of the widely spread and accepted applications in the field of M-Commerce in Germany. In addition, the study concluded that technological innovations in the field of telecommunication will increase the need for mobility.

The study of Begum (2011) in Bangladesh titled "*Prospect for Cell Phones as Instructional Tools in the EFL Classroom: A Case Study of Jahangirnagar University*" aims to investigate the potentiality of cell phone use in the English For Learning (EFL) classroom of Bangladesh as an instructional tool. The researcher conducted a case study on Jahangirnagar University of Bangladesh for the study; some SMS based class tests were conducted in English department of the university where one hundred undergraduate EFL students participated as subjects. Before the tests, some EFL teachers sent mobile SMS to students as a means of instruction for teaching appropriate use of preposition for one week. After one week, the teachers took some class tests where the test questions were delivered via SMS and the students also answered the test questions by mobile SMS. Data collected through students' questionnaires, and teachers' interview records and classroom observation reports. The results demonstrated that cell phone has great potential as an instructional tool despite some challenges that can be resolved by the sincere attempts of the authority, teachers and by changing the ethical point of view that consider cell phones as mere a disturbing factor in the classroom.

The main difference of this research from the previously mentioned studies is that An Improved SMS User Interface System not only allows student to request the university services, it provide university information as soon as they become available. Error handling is an essential part of An Improved SMS User Interface System, as errors are bound to occur, especially in situations requiring student input. Students can misspell words, mismatch format, or even send the message to a wrong number. A feedback mechanism is therefore essential to inform students of their errors and provide suggestion of what went wrong. However, to ensure that students find the system friendly, error handling and notification is important. This system checks for possible errors in a received SMS and sends an error. An Improved SMS User Interface System offers a reasonable level of security, which most similar systems do not provide. One Time Password (OTP) will be used. On the other hand this research tried to find the possibilities of how we can minimize crowds in IUG web page during registration days. Therefore, a case study on IUG students was analyzed based on a distributed questionnaire to achieve the research objectives, to ensure that the research is kept on track.

CHAPTER THREE
SYSTEM DESGIN

This chapter consists of the following sections:

CHAPTER THREE
SYSTEM DESGIN

3.1 Introduction

Wireless mobile application can be differentiated by two underlying technology platforms: wireless web-based technology, such as WAP, and text-based technology or SMS. SMS is a basic and common feature given by cellular operators to users. To use WAP feature, users have to activate GPRS facility and they have to use mobile phone which has WAP capability. Recently, the growing influence of SMS has attracted significant attention. As a convenient and low-cost mobile communication technology, SMS is experiencing very rapid growth. The worldwide increasing growth of SMS messaging services has spurred the developments of SMS commerce applications, which mainly cover consumer-orientated business such as alerting, ticket booking and retailing. Given that the huge SMS messaging customer base could potentially serve as major component of the SMS-commerce customer base, many commerce providers are becoming more interested in SMS commerce applications (Pramsane & Sanjaya, 2006).

The university as an educational organization has a lot of valuable information which can be provided to the students, such as (1) grade release, (2) enrollment information, (3) university announcement, and (4) internship opportunity.

If the university can provide services via SMS service, the students can get the information easier and faster. They can request the information from the service provider at their own convenient time through their cell phones.

Mobile phones are nearly ubiquitous amongst IUG students in Palestine-Gaza Strip. A result from the Survey indicates that 97.9 % of respondents are using a mobile phone in May 2011.

An Improved SMS User Interface System to Support university Services not only allows student to request the university services, it provide university information as soon as they become available. This is done by pushing information to the students (sending it to their phones) or working on a request sent from a student to produce the answer (pulling). There are two methods of SMS widely used in applications, they are the PUSH & PULL. This application can either be used to push or pull messages.

a) **A Push SMS application:** is one whereby a message is sent from the application to the student. It is a one way message. In other words, it is the mobile application (in this case, SMS User Interface application) that initiates a message.

   An example could be a university that automatically sends examination results to the students as soon as the grades become available.

   The students do not request the grades, do not take any action, and are not charged for receiving the SMS. The SMS would be delivered to them in a matter of seconds regardless of where they are, as long as their mobile phone is within their network operator's coverage.

b) **A Pull SMS application:** on the other hand, is one whereby a student sends a request and obtains a reply from the application. This is a full duplex scenario.

   An example is when a student requests for his/her grades for a recently concluded semester.

SMS applications can be built as two kinds of services:

1- **Independent Service:** This involves using solely a mobile phone or GSM modem and the application server (the system running the SMS application). This option offers limited benefit, but it is easy and fast to setup. It does not require authorization of the service provider or connection to any third party SMS provider. The mobile phone uses a regular SIM card which has a normal phone number, and messages that originate from the phone attract the standard cost or tariff. It can be created by the university itself using one cell phone or GSM modem and one server (Awodele et. al., 2009). Figure (3.1) shows independent services diagram.

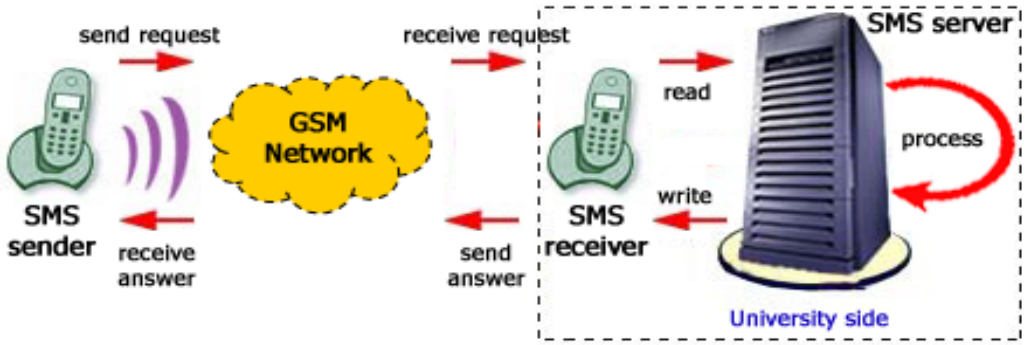


Figure (3.1): Independent Service [Source: Awodele et. al. (2009)]

2- **Dependent Service:** This involves having the application server connect to the service provider's SMS Center (SMSC). It requires a constant connection to the internet as the application server does not require any physical phone/modem with a SIM card connected to it; rather it connects to a SMSC (Awodele et. al., 2009). Figure (3.2) shows dependent services diagram.

When students send their request, it goes to the SMSC, which automatically forwards the message to the application server over the internet. This option provides added benefits, as the service provider can provide a special tariff and a dedicated line for the university.

Here, the SMS application usually runs on corporate servers that are connected to the SMS network through specialized connectors and gateways connected to the SMS Center (SMSC) of mobile operators (Mavrakis, 2004).

These servers are assigned short numbers instead of the traditional 10 or 11 digits mobile numbers. These numbers, also known as short codes, are usually 4 to 6 digits long and are operator specific. Also, a premium fee (a fee other than the fixed rates for SMS) can be charged on these short codes; in other words, students would pay more for sending SMS to short codes.

Figure (3.2) Dependent Service [Source: Awodele et. al. (2009)]

SMS uses the GSM special signaling channel instead of the voice channel therefore, a very reliable media channel. Mavrakis (2004) identifies two types of SMS which can be classified by the origin of the message:

1) **Mobile Originated (MO)**: SMS-MO is sent from a mobile phone and could be sent either to another mobile phone (such as when a mobile subscriber sends a personal message to another subscriber) or to a computer application that will process the message.
2) **Mobile Terminated (MT)**: SMS-MT is transmitted to a mobile phone. It also could be sent by another mobile phone or generated by a computer application (Adagunodo *et. al.*, 2007).

Both of the services have their own benefits and difficulties in the different levels which depend on the institutional condition. The choice will also affect both the cost and the pricing in providing the service (Rotimi et. al., 2007).

3.2 Data Mining In SMS User Interface System

Due to the large number of students and the large amount of transactions expected to be carried out using SMS, there is a need for methodologies of Knowledge Discovery and Data Mining (KDD). Data mining is becoming increasingly common in both the private and public sectors. Industries such as banking, insurance, medicine, and retailing commonly use data mining to reduce costs, enhance research, and increase sales.

The question to ask now is, **"What is Data Mining?"** Rotimi et. al. (2007) defines Data Mining as "the *use of sophisticated data analysis tools to discover previously unknown, valid patterns and relationships in large data sets*".

Hence, the SMS User Interface application should be able to effectively analyze all University transactions. If data is successfully analyzed (mined) over a period of time, the university can develop models.

According to Rotimi et. al., (2007), there are basically four issues with data mining, they are:

1. Data quality: This is a one of the biggest challenges of data mining. Data quality refers to the accuracy and completeness of the data. Data quality is mostly affected by the structure and consistency of the data being analyzed. For example, a student might want to register new subject but mistakenly enters a wrong subject no., this would most definitely affect the result he gets from the SMS User Interface application.
2. Interoperability: Interoperability refers to the ability of a computer system or data to work with other systems or data using common standards or processes. Hence, it should be possible for SMS application to use the data gotten from another SMS application.
3. Mission Creep: Mission creep refers to the use of data for purposes other than that for which the data was originally collected. This happens when account information and financial transactions are audited against fraud or illegalities.
4. Privacy: This is of great concern because, students account information needs to be kept private and at the same time analyzed.

3.3 Existing System Overview

3.3.1 Existing System Overview through Website (*http://www.iugaza.edu.ps*)

IUG has provided academic services on website since 2005. Some information such as academic record, enrollment services, and personal services can be accessed at ***http://www.iugaza.edu.ps***. IUG services are made available on the website, students have to login by providing a Roll number and Password before they can access their academic services. This ensures that academic services are protected from unauthorized access. Although websites are readily accessible and provide options like printing and saving, these benefits could easily be inaccessible if a user does not have access to the internet. Also, the student must visit the website to find out if the examination results are available. While websites seem to be a very good option where the internet is readily available, its impact can be less felt and it can be quite inconvenient and expensive where poor internet access. In such places, students will have to visit cafes where they have to pay to check their university services.

On the existing system, the users can get the information only from the web browser, which is provided by computer, and several high-end mobile phones. Not every mobile phone can access this system and the students must activate the GPRS facility to access the website from mobile phone. The proposed system is offering the SMS service which can be used by all the mobile phones. The student only sends SMS to the system and the system will reply the answer back to the student as SMS also.

3.3.2 Existing System Overview through SMS

IUG student needs to register his/her mobile phone and pay services through the IUG portal. IUG accepts numbers from the mobile providers. Once a mobile phone is registered, the student can use her/his mobile to receive SMS as soon as the examination results are become available. However, students can only use the mobile number that was registered to get exam results. The students do not request the grades, do not take any action, and are not charged for receiving the SMS. The SMS would be delivered to them in regardless of where they are, as long as their mobile phone is within their network operator's coverage.

3.4 Proposed System Overview

3.4.1 Introduction

The proposed system will use SMS which is dependent on the telecommunication infrastructure provided by GSM operators to provide a means of cheap and fast communication between the students and the university. This system will provide access to university services.

As shown in figure (3.3) before students can use the services, they must pay the services through the IUG financial department or bank transfer. After that, students can use the services and send the request to the SMS server. SMS server will check the roll number and password and compare to the student database. If the roll number and password are correct, server will check student's balance. If there are enough points, server will check the answer based on students request then the answer will be sent to the student and the student's balance will be deducted.

Error handling is an essential part of good system, as errors are bound to occur, especially in situations requiring student input. Students can misspell words, mismatch format, or even send the message to a wrong number. A feedback mechanism is therefore essential to inform students of their errors and provide suggestion of what went wrong. However, to ensure that students find the system friendly, error handling and notification is important. This system checks for possible errors in a received SMS and sends an error notification to the students. Possible errors are a wrong Roll number and password combination, keyword, a wrong SMS format, etc.

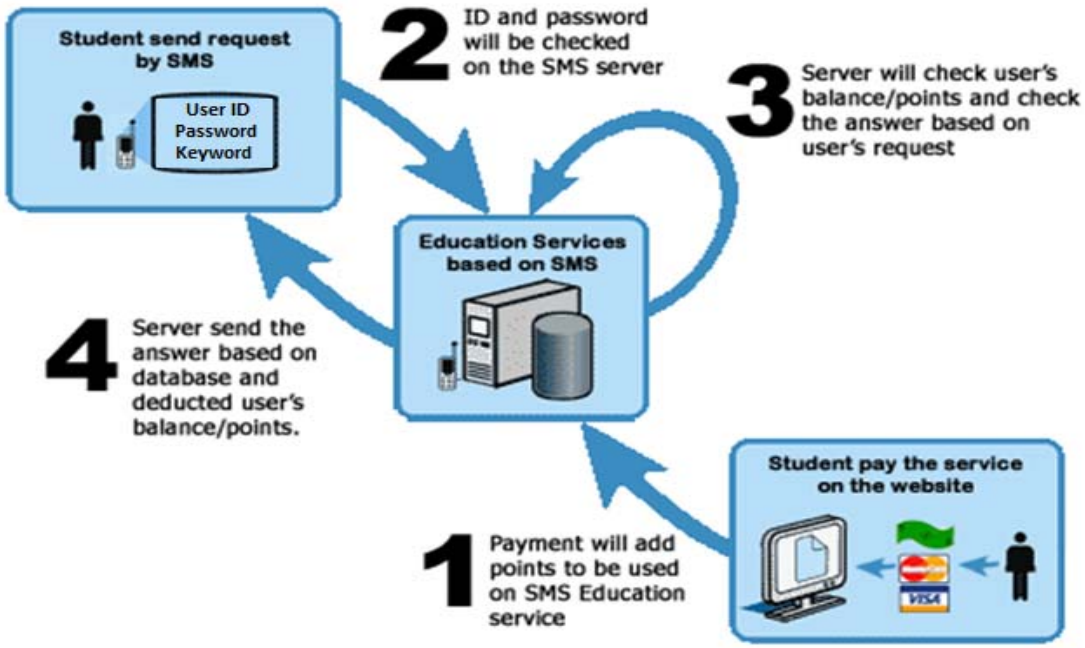


Figure (3.3): A whole processes on the proposed system [Source: Pramsane & Sanjaya, (2006)]

The features of An Improved SMS User Interface System are:

The proposed system solves all the problems identified in the existing systems; the features of the proposed system are outlined below (Adagunodo et. al., 2007):

a) All phones are capable of sending SMS to it (it is portable).

b) It will receive SMS from all kind of phones from all networks.

c) It functions 24 hours a day.

d) Students are notified when they make valid or an invalid requests.

e) It is relatively easy to customize.

f) It uses passwords to provide security.

g) It provides more flexibility, by allowing many services.

3.4.2 Proposed system as an independent SMS service

For the first time, the University can use one GSM modem and one server as SMS server (independent service). Database server also can be connected to the SMS server to supply data. If the student sends a request through SMS, the mobile network will receive it and send it again to the SMS server. The SMS server receives SMS messages from students and processes the message by connecting to the database that holds the details and information. The SMS server receives all SMS via the GSM terminal connected to the computer; it then connects to the database to authenticate the student and queries for the results via the appropriate database connector.

Figure (3.4) shows Independent SMS Service Conceptual Model and Figure (3.5) Illustrate the SMS request and answer.

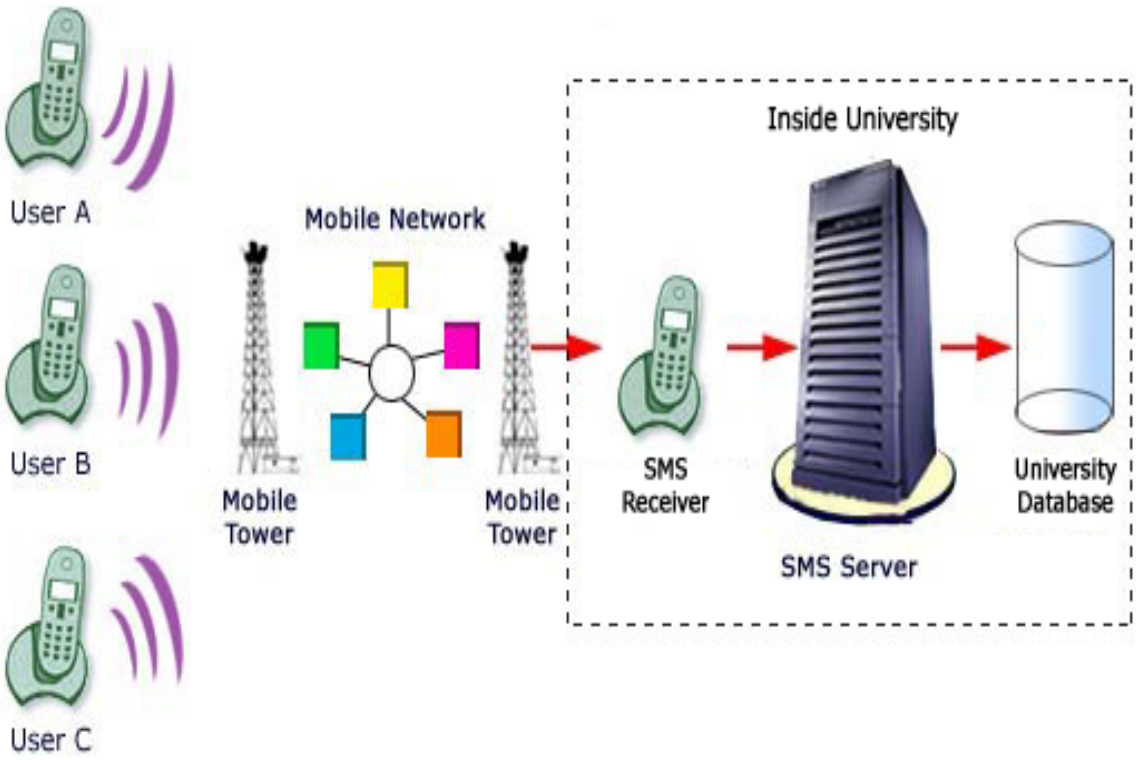
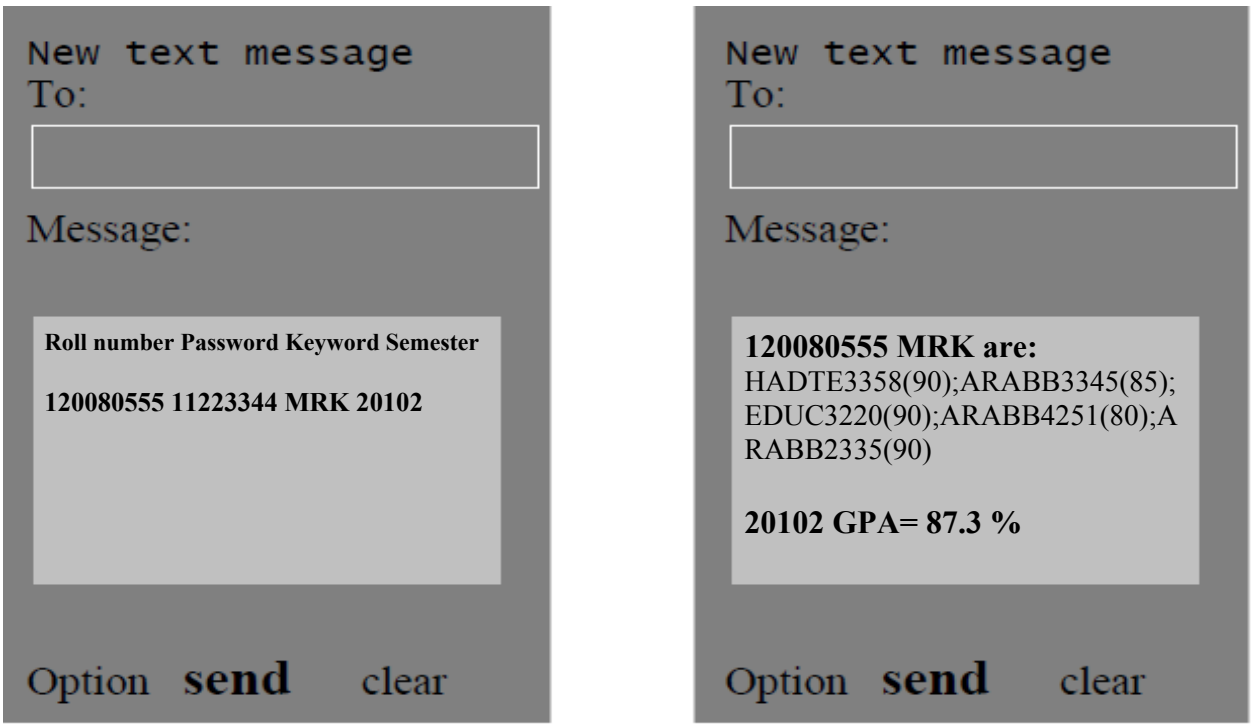


Figure (3.4): Independent SMS Service Conceptual Model

[Source: Adagunodo *et. al.* (2009)]



REQUEST **ANSWER**

Figure (3.5): Illustration Request and Answer

The steps of reading and sending SMS on the server show on figure (3.6). Those steps are:

a) Frequently, server will check the SMS from the GSM modem and translate from PDU format into plain text.

b) The translation message will be read and divided into parts for example (Student Roll number, Password, Keyword and Semester No.). Then, the Student Roll number and Password will be compared with data on the Authentication table.

c) If matched, the system will check the balance. But if not matched, the SMS will be ignored.

d) If there are enough points to be used, the system will process the request and compare the keyword with the available services. If not available, system will send a SMS warning to the student. Otherwise, the system will query the answer from the database.

e) Translate from plain text into PDU format.

f) Send the answer back to the student.

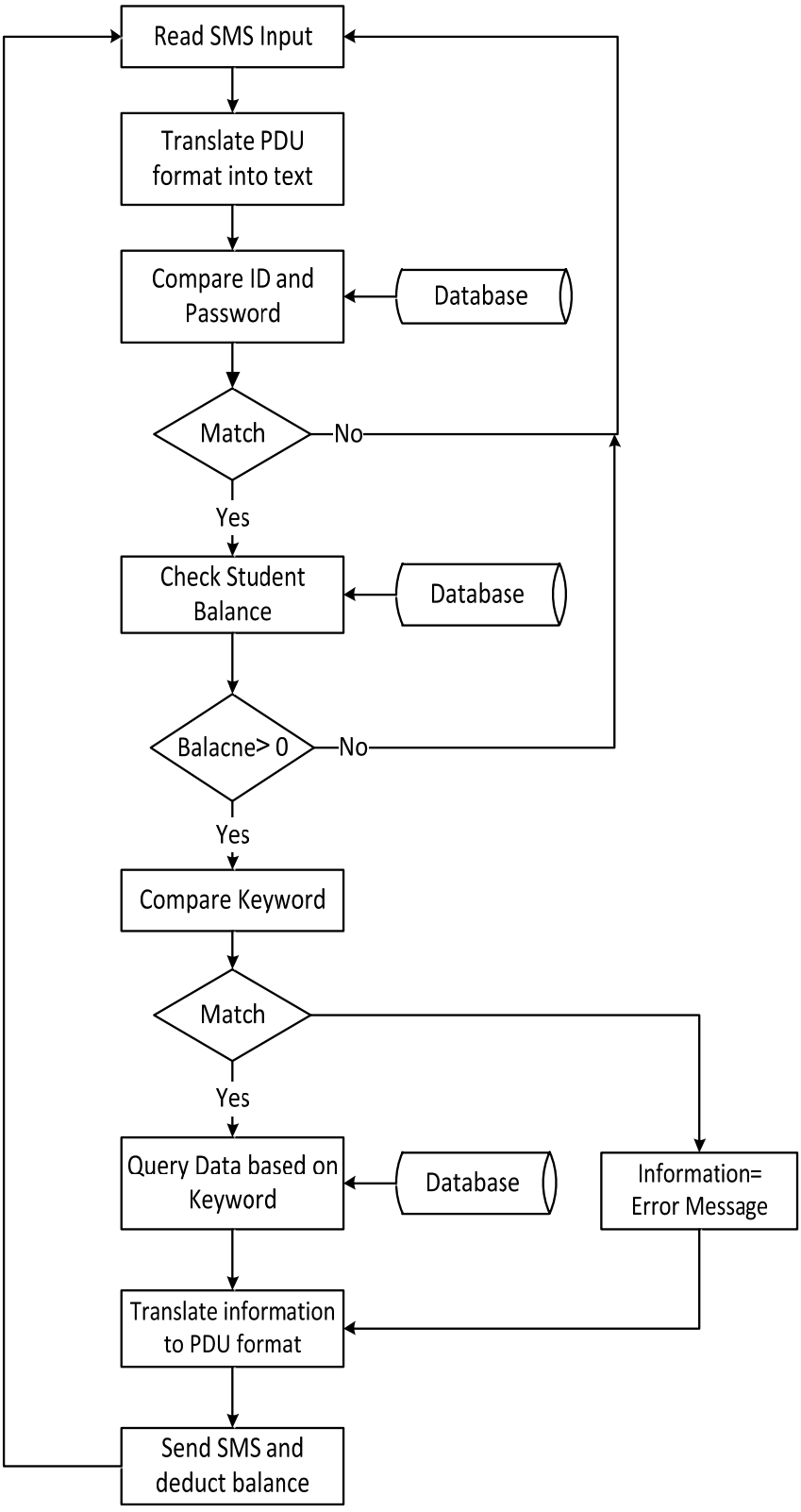


Figure (3.6): Reading and Sending SMS

An Improved SMS User Interface System consist of four processes, which are (1) translation the SMS into text message and save the request, (2) checking point's balance of student's points, (3) find the answer based on SMS request, and (4) send the reply SMS of required information, save the answer into SMS-record database, and deducted student's points based on price of data.

3.4.3 Implementation

To read and answer the SMS request, the system needs one set of software which can download the message from mobile phone, translate the message into text, query to the database based on message, and send the answer back to the student. It needs several components, such as Web Server, Web Application, Database Server, and the Payment Gateway. Figure (3.7) described hardware architecture design of implemented an independent SMS service**.**

IUG must provide the necessary hardware and software requirement, which primarily are:

1. A GSM modem that supports communication with a computer.
2. SIM card; one SIM card from any cellular operator.
3. A computer system to host the SMS application.
4. A network connection to the database server to provide connectivity of data source from the actual database.
5. Software which can download the message from GSM modem, translate the message, query to the database based on message, and send the answer back to the user. "Qzeki software is recommended".
6. Cable data to connect GSM modem to the computer.

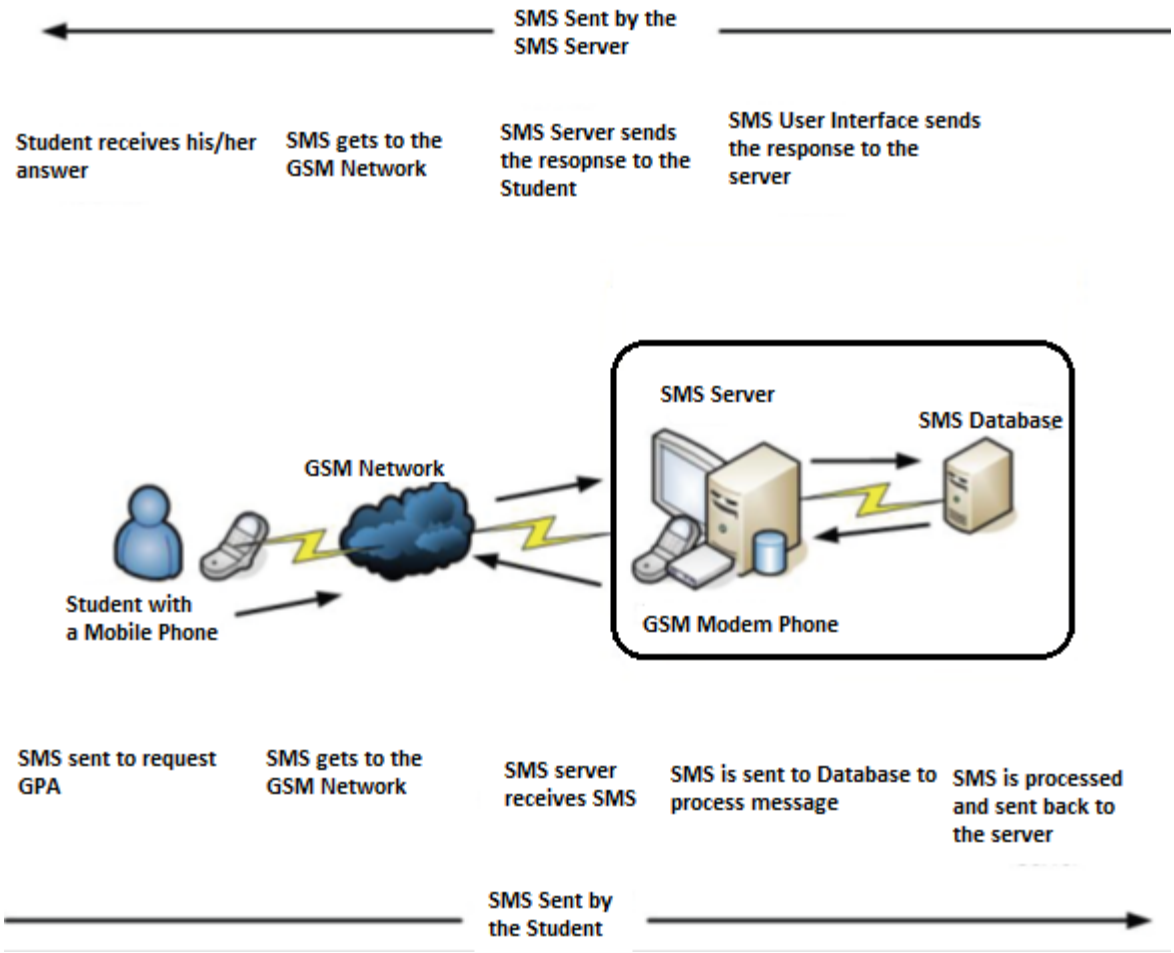


Figure (3.7): Hardware Architecture Design

The processing time on the computer depends on the time of connection or handshaking between the computer and the mobile phone. The result time is always different. The second factor depends on the processing time when the application looking for the answer from database. The execution time is usually the same or always stable.

The service also depends on the peak time and the network. If students send the request in the peak time, the reply might be late because the server is late to receive the request or the students are late to receive the answer. If the university only provides one GSM modem of SMS service, the SMS request from the cellular operators might have a problem. Sometimes there is technical problem compatibility of sender and receiver networks.

If the numbers of request are getting high, there is recommendation to provide the dependent service based on HTTP. However, there is a need for an agreement between the university and the cellular operators to provide the SMS service. The university must have agreement with all cellular operators to provide the service to all students who are customers of different cellular operators.

3.4.4 Features of an Independent SMS Service:

a) It will receive SMS from all kind of mobile phones from all networks.

b) It functions 24hrs a day.

c) Users are notified when they make an invalid request.

d) It is relatively easy to customize.

e) It uses passwords to provide security.

f) It provides more flexibility, by allowing many services options.

3.4.5 Proposed system as Dependent SMS Service

The university needs to accept an agreement with cellular operator, there is a need to provide 24-hour internet connection. It has function to receive any SMS from the SMS center via internet. Figure (3.8) describes dependent SMS service conceptual model

The student's request from their mobile phone will be accepted by an operator cellular on the SMS center. Then, the SMS server will send the message via internet to a specific port on the HTTP server. The HTTP server will receive the message and compare it with the available services. The result will be sent to the SMS center via internet and forwarded it to the users' mobile phone.

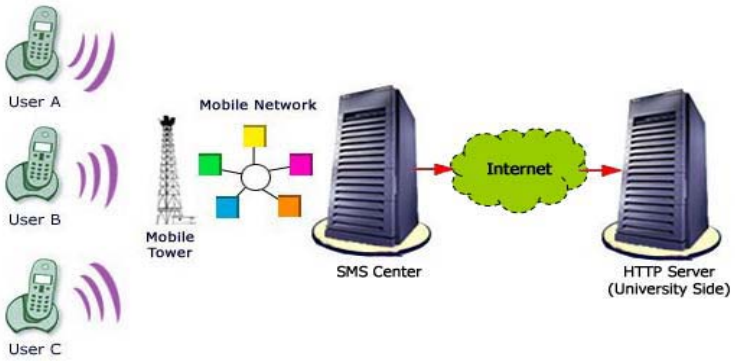


Figure (3.8): Dependent SMS Service Conceptual Model

[Source: Adagunodo *et. al.* (2009)]

The process on the HTTP server can be seen on figure (3.9). First of all, a HTTP server will listen to the request from the SMS Center. Then, the request as the keyword will be compared with the available services. If matched, it will query to the database and produce a result as the information. Otherwise, it will produce the error message as the information. The information will be sent to the SMSC via internet.

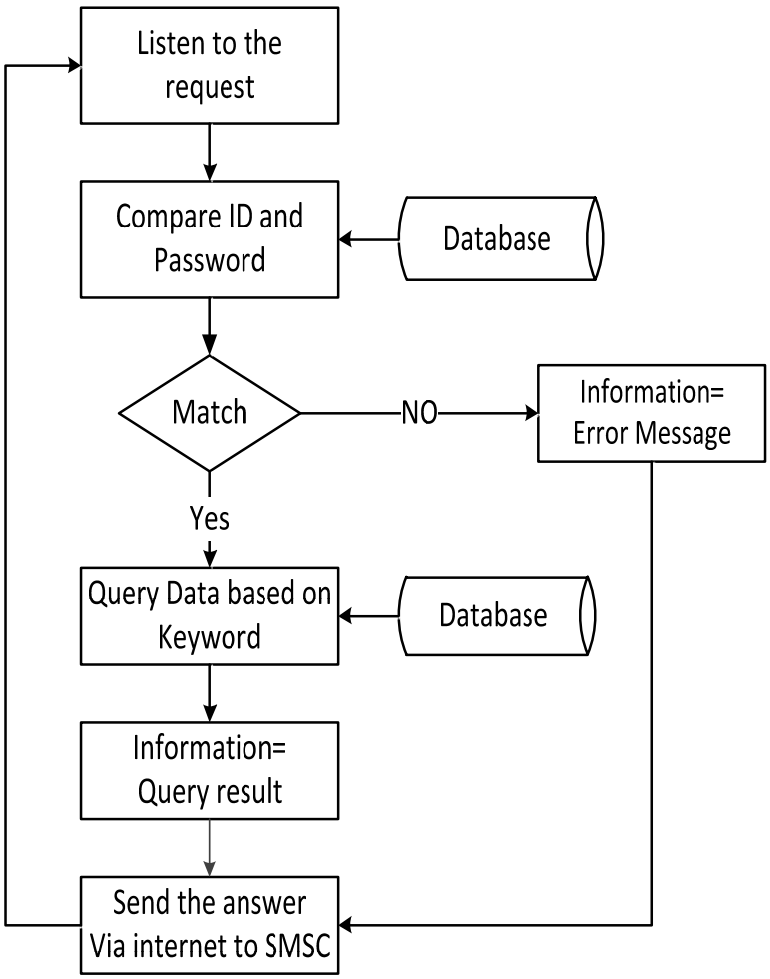


Figure (3.9): Process on the Server Side

3.4.6 Features of Dependent SMS Service:

1. The capability to receive thousands SMS per seconds.
2. No need for mobile phone or GSM modem.
3. The payment system will deduct automatically by the cellular operator from their user balance. But the university must have agreement with the cellular operators.

3.4.7 The limitation of Dependent SMS Service

1. One cellular operator can accept the requests from their own users only; the university must have an agreement with all cellular operators to accept the student requests from any different cellular operators.
2. The price of service depends on the cellular operator. It might be more expensive because there is a sharing of profit between the university and cellular operators

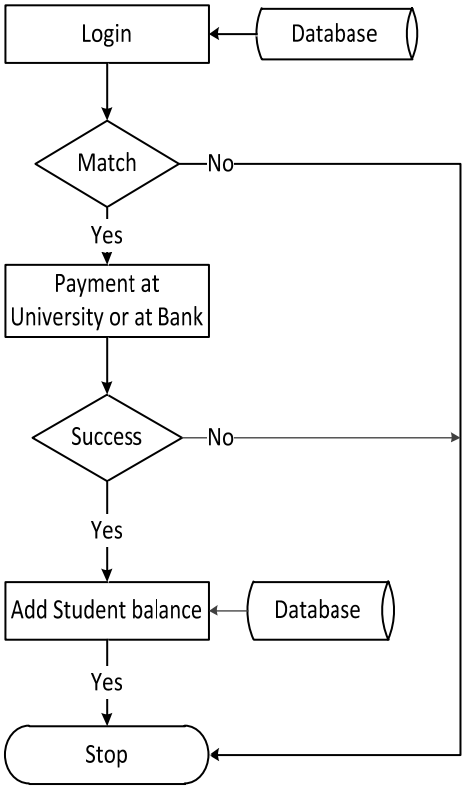
3.4.8 Implementation of Dependent SMS Service

To use the dependent SMS services, IUG must provide the necessary hardware and software requirement, which primarily are:

1. A network connection to the database server to provide connectivity of data source from the actual database.
2. Software which can download the message from SMSC, translate the message, query to the database based on message, and send the answer back to the user. "Qzeki software is recommended".
3. Agreement with the cellular operators.

3.5 The process of payment system

As seen in figure (3.10) the process of payment system. The students can pay the services through the university financial department or bank transfer. Each successful payment is done by keeping adequate balance. It will be used for getting the information from the SMS services.



Figure(3.10): Adding Student's Balance

3.6 Security

Literature has proven that there have been more attacks on the web than SMS. All these imply that websites, though convenient to use, do not offer a totally secured solution (Awodele *et. al.,* 2009).

Like other means employed by universities to disseminate examination results and other similar information, which includes website and email there exists the possibility of errors and security issues. While most universities make results available on their websites, students have to at least securely login to the website using their Roll number and a password. Apart from the possibility of a student knowing the Roll number and password of another student, the possibility of a guess can occur.

Although, most websites offer a secure form of authentication like HTTPS, there is really no means of telling that the person that supplied the Roll number and password on the site is the actual student.

SMS on its own has several limitations, which include the limited number of characters allowed and the unavailability of features like printing, tables, images, etc. It, however, has almost the same security threat as the other means, considering the fact that same way a hacker can tap into a text message, the hacker can also hack into a university website and pull results or manipulate the database, which is more disastrous (*WrongSMS leads to suicide*, 2004).

The proposed system offers a reasonable level of security, which most similar systems do not provide. One Time Password (OTP) will be used.

OTP: is a security system that requires a new password every time a student authenticates themselves, thus protecting against an intruder replaying an intercepted password. OTP generation algorithms typically make use of randomness. This is necessary because otherwise it would be easy to predict future OTPs by observing previous ones.

Specifying a password in the SMS ensures that if a cell phone gets stolen or get into the wrong hands, the student's information cannot be accessed unless the password is specified.

To protect the information security, it needs preventive and persuasive action such as:

a) Using Password: password is needed to protect the SMS service. Every student must send the correct Roll number and password to access the academic information. It is a first action to prevent the system from unauthorized students.

b) Limitation the Access Rights: the access rights to the database must be limited on the specific tables and only has rights to read.

c) IP Address Filtering: IP Address Filtering has objective to limit the computer which can access the database server. Because the SMS server has a specific IP address, the database server can filter and only allows the specific IP address to access the data.

d) Firewall and Antivirus: Firewall and Antivirus can be used by database server and SMS server to protect the server from unauthorized requests and viruses. Only specific request and specific port can be opened to receive the requests and answer them.

e) Using UPS (Uninterruptible Power Supply): UPS is provided to prevent the computer and network from blackout and abnormal electricity. It also can protect data and network equipment from any damage which is caused by the electricity.

f) Increase Physical Security. There are several ways to provide the physical security such as: Providing security persons; Place the server in the safe and secure location from rain, flood, or crowded people.

Place the important data in the different location and make the backup in the different else location; Provide the security system using lock or identity card.

g) Personal Approaches: there are several approaches which can be given to the user, such as: Give the clear instruction to the user; Give the education to the operator; Give the procedure and discipline of using equipment to the operator and administrator.

h) Update the system periodically: persons who did the system update to prevent the system from technological obsolescence. Patches which are provided by the software producer must be downloaded and installed to the system. The patches can be a protection from security holes or bugs.

3.7 Software Design

3.7.1 Input Design

The inputs are sent to the server as a text message, once the server receives the message, it processes it and the output is also sent as a text message back to the student. Below are the input operations which are sent to the server in case of use the same password (do not use OTP):

3.7.2 Transactions for SMS User Interface System to Support University Services:

There are a set of transactions that can be carried out using the SMS. They include almost all functions that are presently being performed in the University hall. Examples are, checking account balances, registration for new subject, delete existing subject, queries, requests for the detailed examination results, requests for the Grade Point Average (GPA), changing of password, etc.

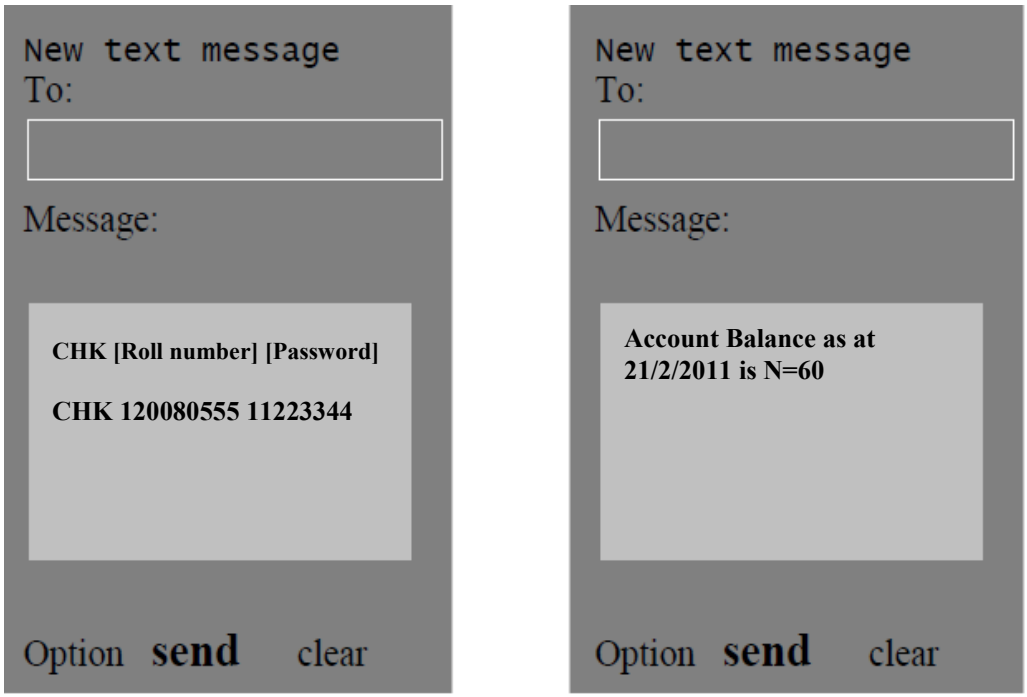
i) Checking account balances (CHK):

To check account balances or status of the account: The student has to send **"CHK [Roll Number] [Password]"**. (**CHK** is the abbreviation of word Check).

SMS module will check student balance. If there are enough points, module will check the answer based on the student request else the message will be ignored. If there are enough points SMS module checks if the student's Roll Number exists and also checks if the password sent also exists, if the password corresponds with the Roll Number sent, . If the Roll number and password are incorrect the message "**Make sure your Roll Number and Password are correct, Thank you"** will be sent to the student else the module will check the keyword exists in database keywords. If the keyword is incorrect the message "**Make sure that the Keyword is correct, Thank you"** will be sent to the student else the module will check the answer, then the student's account balance is sent to his/her GSM

phone number which was used to request for the balance. The student receives the message in this format.

"Account Balance as at [Date] is N= [amount]" and the balance will be deducted.



Request **Answer**

Figure (3.11): Checking account balances in SMS User Interface System

ii) Requests for Grade Point Average (GPA):

To request for GPA: The student has to send**“ [Roll Number] [Password] GPA”.** SMS module will check student balance. If there are enough points, module will check the answer based on the student request else the message will be ignored. If there are enough points SMS module checks if the student’s Roll Number exists and also checks if the password sent also exists, if the password corresponds with the Roll Number sent. If the Roll number and password are incorrect the message “**Make sure your Roll Number and Password are correct, Thank you**” will be sent to the student else, the module will check the keyword exists in database keywords. If the keyword is incorrect the message “**Make sure that the Keyword is correct, Thank you”** will be sent to the student else the message: **“[Roll Number] GPA=… %”** will be sent to the students and the balance will be deducted.

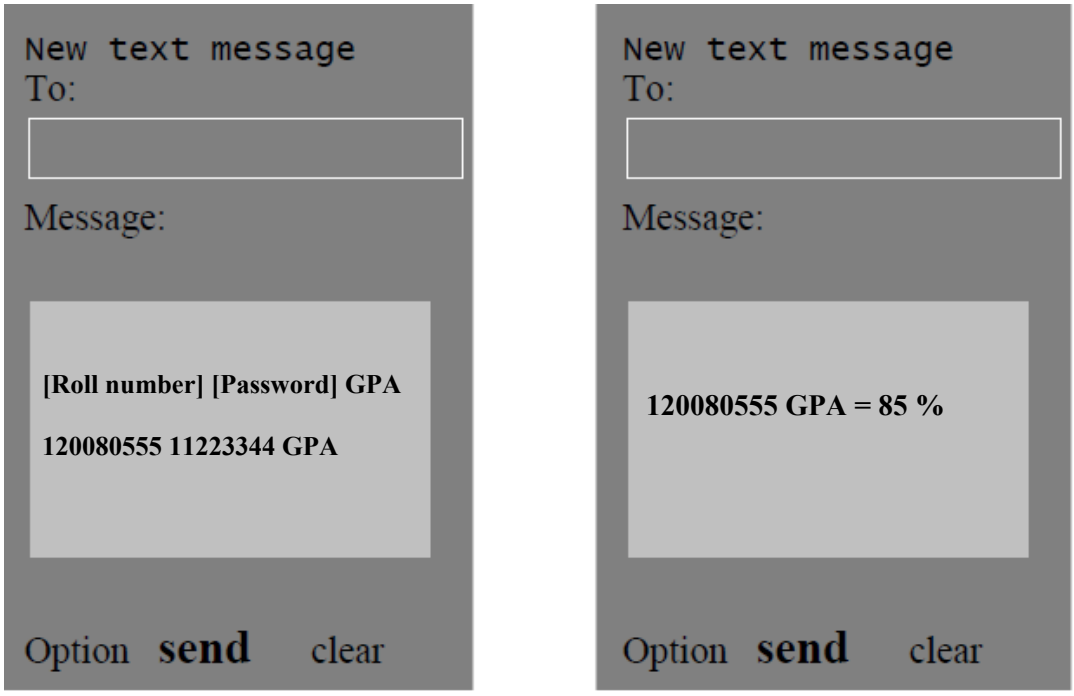


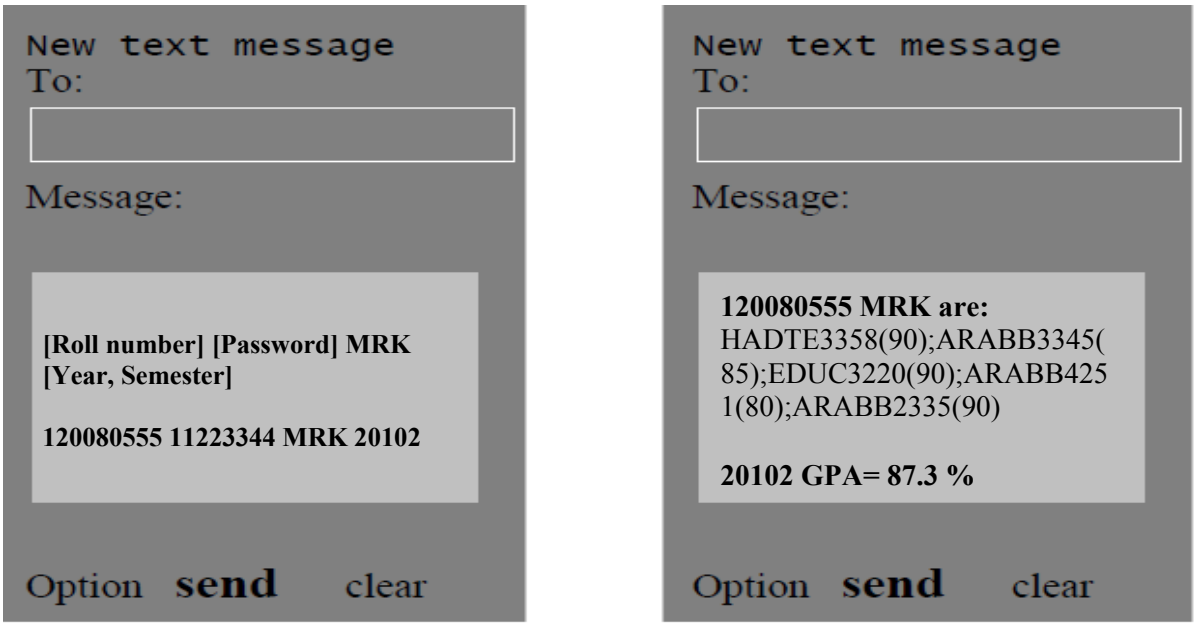
Figure (3.12): Request for GPA in SMS User Interface System

iii) Requests for the detailed examination results

As an advantage of this module, it allows students to check for results of past semesters. In this case, the student can specify which year and semester for which they want to access their grades. It is also possible to accept request for a particular course. (MRK is the abbreviation of word MARK, 20102 the first 4 digit define the year and the fifth digit means the no. of semester, so 20102 means the 2nd semester in year 2010)
To request for the detailed examination results: The student has to send

" [Roll Number] [Password] MRK [Year, Semester No.]"

SMS module will check student balance. If there are enough points, module will check the answer based on the student request else the message will be ignored. If there are enough points SMS module checks if the student's Roll Number exists and also checks if the password sent also exists, if the password corresponds with the Roll Number sent. If the Roll number and password are incorrect the message **"Make sure your Roll Number and Password are correct, Thank you"** will be sent to the student else the module will check the keyword exists in database keywords. If the keyword is incorrect the message "**Make sure that the Keyword is correct, Thank you"** will be sent to the student else the module will check the answer based on the student request then the answer **"[Roll Number] MRK are:[Subject](Grade)"** will be sent and the balance will be deducted .



Request **Answer**

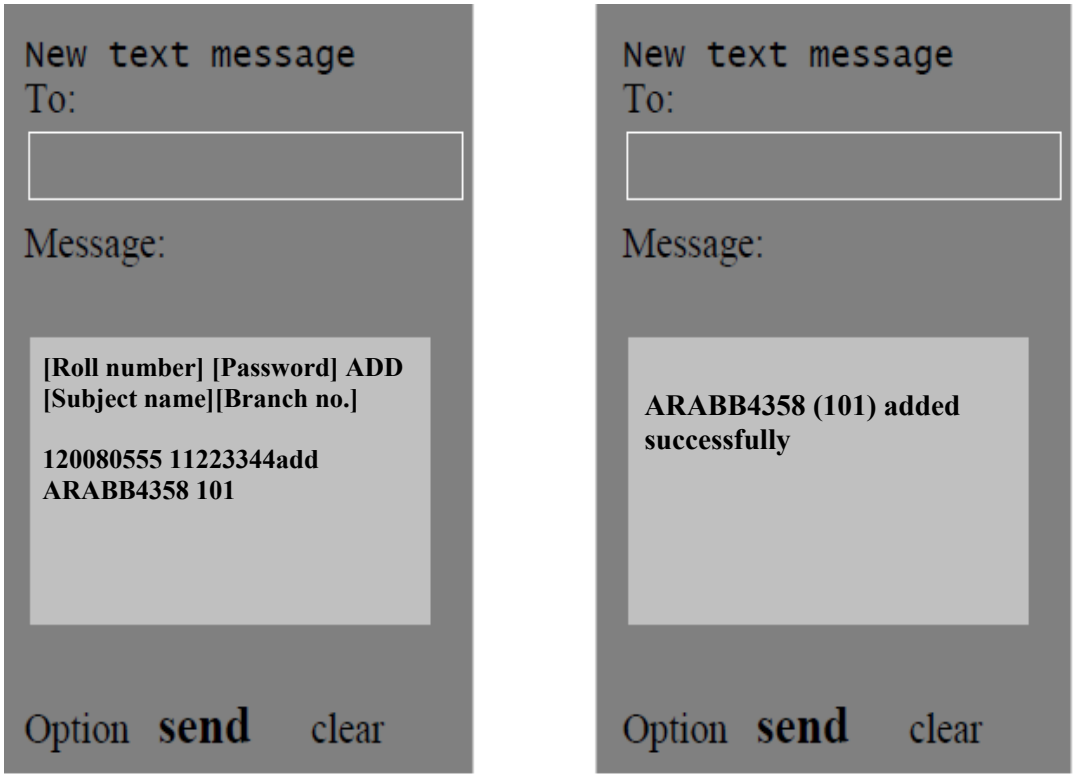
Figure (3.13): Requests for the detailed examination results in SMS User Interface System

iv) Request to register new subject

To register a new subject: The student has to send:

"**[Roll Number] [Password] ADD [Subject Name] [Branch No.]".**

SMS module will check student balance. If there are enough points, module will check the answer based on the student request else the message will be ignored. If there are enough points SMS module checks if the student's Roll Number exists and also checks if the password sent also exists, if the password corresponds with the Roll Number sent. If the Roll number and password are incorrect the message **"Make sure your Roll Number and Password are correct, Thank you** "will be sent to the student else the module will check the keyword exists in database keywords. If the keyword is incorrect the message "**Make sure that the Keyword is correct, Thank you"** will be sent to the student else the module will check the answer based on the student request. Then the module checks if the subject name and also checks if the branch number sent also exists, if the Branch number corresponds with the subject name sent. If the subject name and the branch number are incorrect the message "**Make sure your [Subject Name] [Branch Number] are correct, Thank you"** will be sent to the student else the message**"[Subject Name] ([Branch No.]) Added successfully"** will be sent to the students and the balance will be deducted.



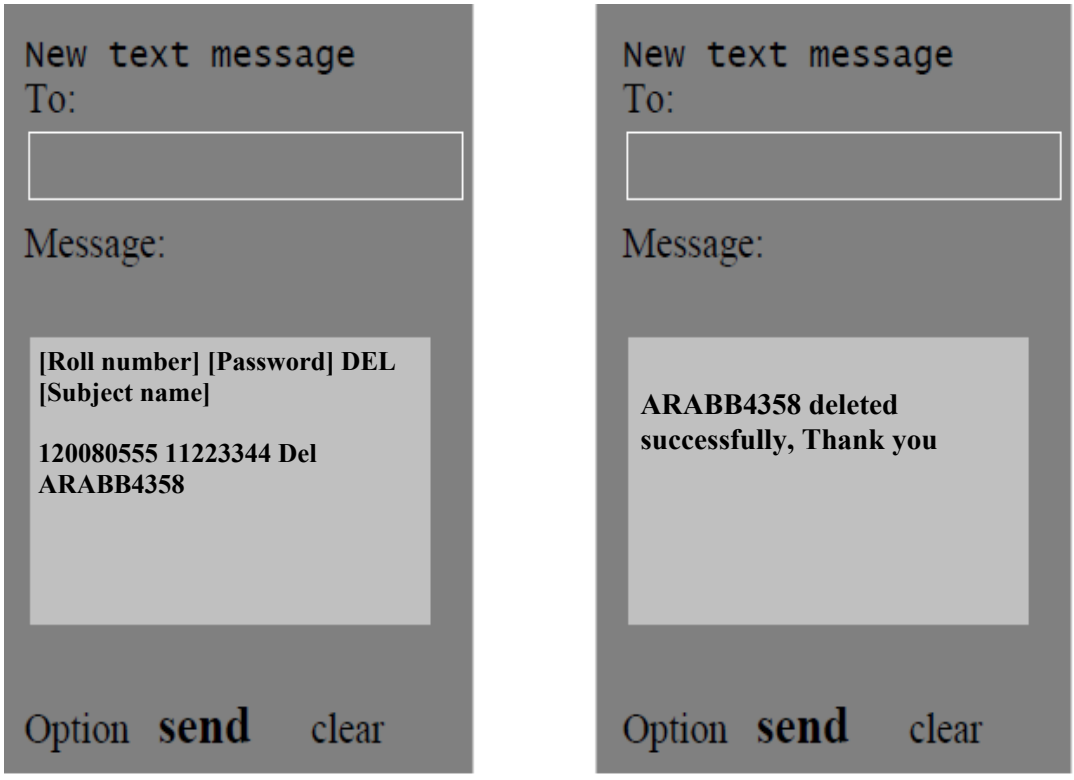
Request **Answer**

Figure (3.14): Request to register new subject in SMS User Interface System

v) Request to delete an existing subject

To request the deletion of an existing subject: The student has to send "**[Roll Number] [Password] Del [Subject Name]**". (DEL is the abbreviation of word delete).

SMS module will check student balance. If there are enough points, module will check the answer based on the student request else the message will be ignored. If there are enough points SMS module checks if the student's Roll Number exists and also checks if the password sent also exists, if the password corresponds with the Roll Number sent. If the Roll number and password are incorrect the message **"Make sure your Roll Number and Password are correct, Thank you"** will be sent to the student else the module will check the keyword exists in database keywords. If the keyword is incorrect the message "**Make sure that the Keyword is correct, Thank you"** will be sent to the student else the module will check the answer based on the student request. Then the module checks if the subject name exists, if the deletion date corresponds with the subject name sent. If the subject name and the deletion date are incorrect the message **"Can't Delete [Subject Name], Thank you"** will be sent to the student else **"[Subject Name] Deleted successfully, Thank you"** will be sent to the students and the balance will be deducted.

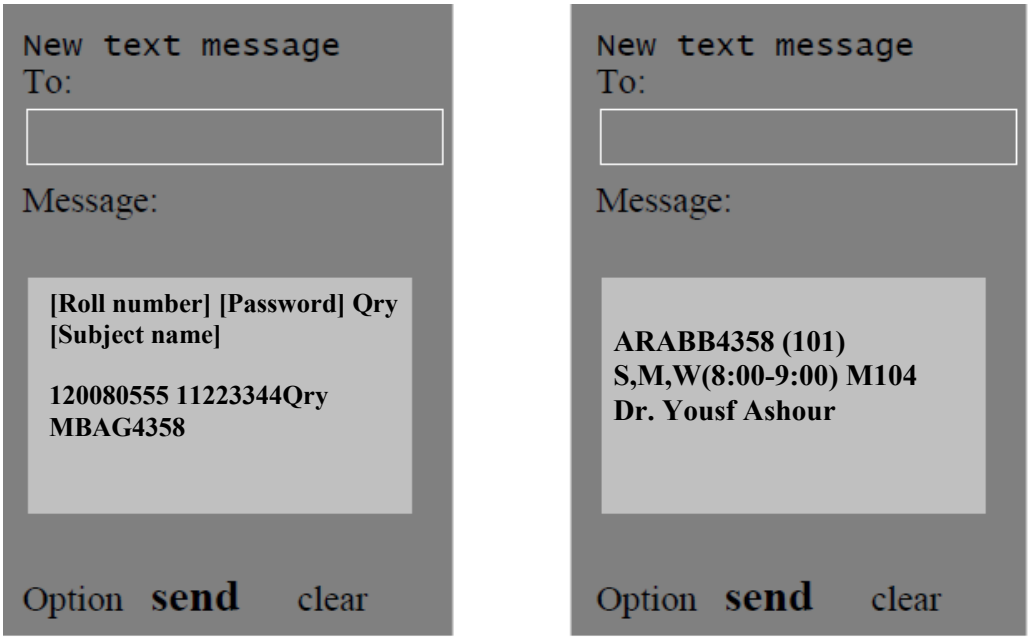


Request **Answer**

Figure (3.15): Request to delete an existing subject in SMS User Interface System

vi) Request to Query of an existing subject (Day, Time, Branch No. ,Class and Teacher)

To Query of existing subject: The student has to send:
"[Roll Number] [Password] Qry [Subject Name]". (Qry is the abbreviation of word query).
SMS module will check student balance. If there are enough points, module will check the answer based on the student request else the message will be ignored. If there are enough points SMS module checks if the student's Roll Number exists and also checks if the password sent also exists, if the password corresponds with the Roll Number sent. If the Roll number and password are incorrect the message **"Make sure your Roll Number and Password are correct, Thank you"** will be sent to the student else the module will check the keyword exists in database keywords. If the keyword is incorrect the message "**Make sure that the Keyword is correct, Thank you"** will be sent to the student else the module will check the answer based on the student request. Then the module checks if the subject name exists and the date of sent message corresponds with the semester no. if the subject name and the date of sent message are incorrect the message **"Can't Query [Subject Name], Thank you"** will be sent to the student else **"[Subject Name] [Branch no.] [Day] [Time] [Class] [Teacher]"**will be sent to the students and the balance will be deducted.



Request **Answer**

Figure (3.16): Request to Query an existing subject in SMS User Interface System

S, M, W: means Saturday, Monday, Wednesday.

M104 : The name of Class in the university.

vii) Changing of Password

The password of an account can be changed if the student wishes to change it. The student has to send a message in this format.

"**Chg [Roll Number] [Old Password] [New Password]"(**Chg is the abbreviation of word Change).

SMS module will check student balance. If there are enough points, module will check the answer based on the student request else the message will be ignored. If there are enough points SMS module checks if the student's Roll Number exists and also checks if the password sent also exists, if the password corresponds with the Roll Number sent. If the Roll number and password are incorrect the message **"Make sure your Roll Number and Password are correct, Thank you"** will be sent to the student else the module will check the keyword exists in database keywords. If the keyword is incorrect the message "**Make sure that the Keyword is correct, Thank you"** will be sent to the student else the module will change the password based on the student request. The student is notified of the change, and he/she receives a message that says **"Password successfully changed** "and the balance will be deducted.

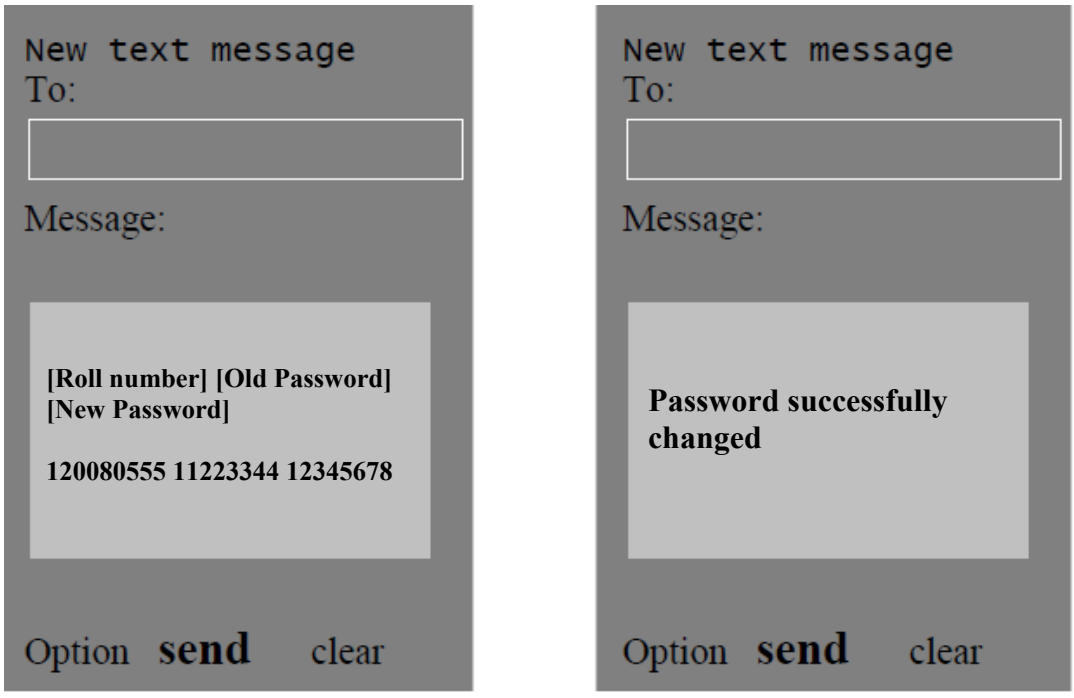
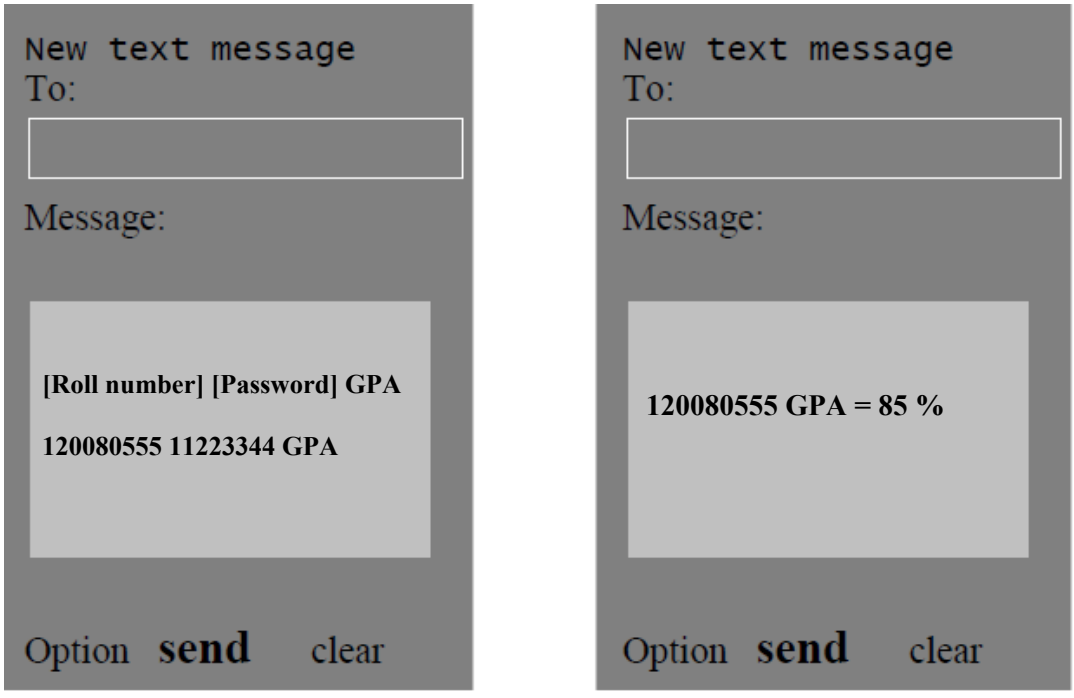


Figure (3.17): Changing of Password in SMS User Interface System

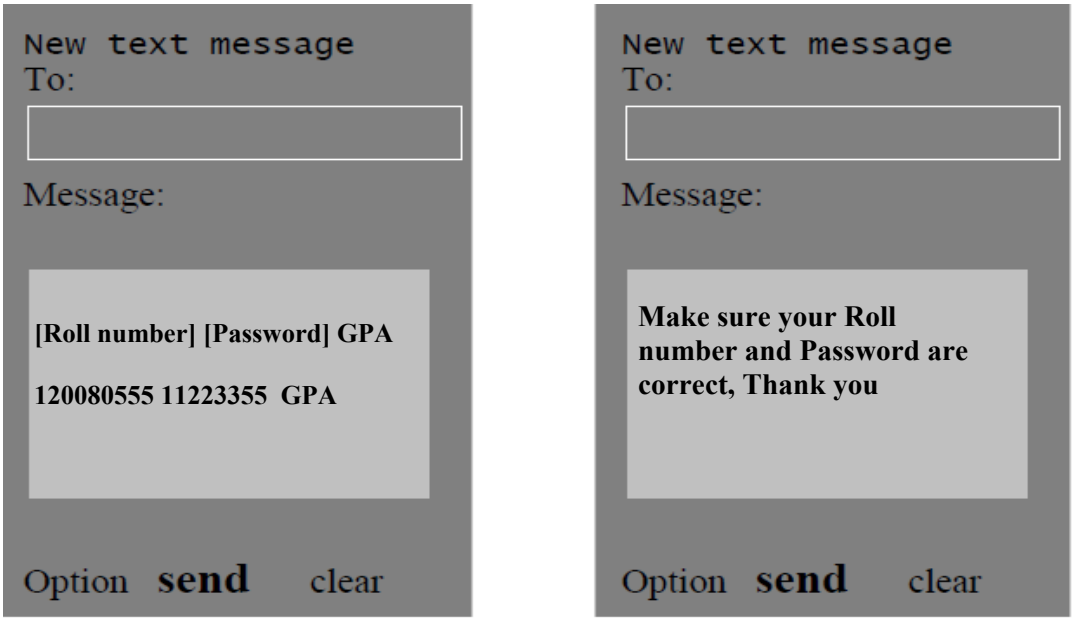
3.7.3 System Verification

As an example of the operation of this SMS User Interface System, the mode of operation is illustrated using a particular 3rd year student by the name **"Mohammad"** with roll number **"120080555"** and his password is **"11223344".** Mohammad wants to know his Grade Point Average (GPA) so he sends SMS message with Roll number, Password and Keyword **"120080555 11223344 GPA"** SMS module will check student balance. If there are enough points, module will check the answer based on the student request else the message will be ignored. If there are enough points SMS module checks Roll number and password and compare to the student database. If the Roll number and password are incorrect the message **"Make sure your Roll number and Password are correct, Thank you"** will be sent to Mohammad else the module will check the keyword exists in database keywords. If the keyword is incorrect the message "**Make sure that the Keyword is correct, Thank you"** will be sent to the student else the module will check the answer based on Mohammad request. Then the answer **"120080555 GPA=85 %"** will be sent to Mohammad and the balance will be deducted.



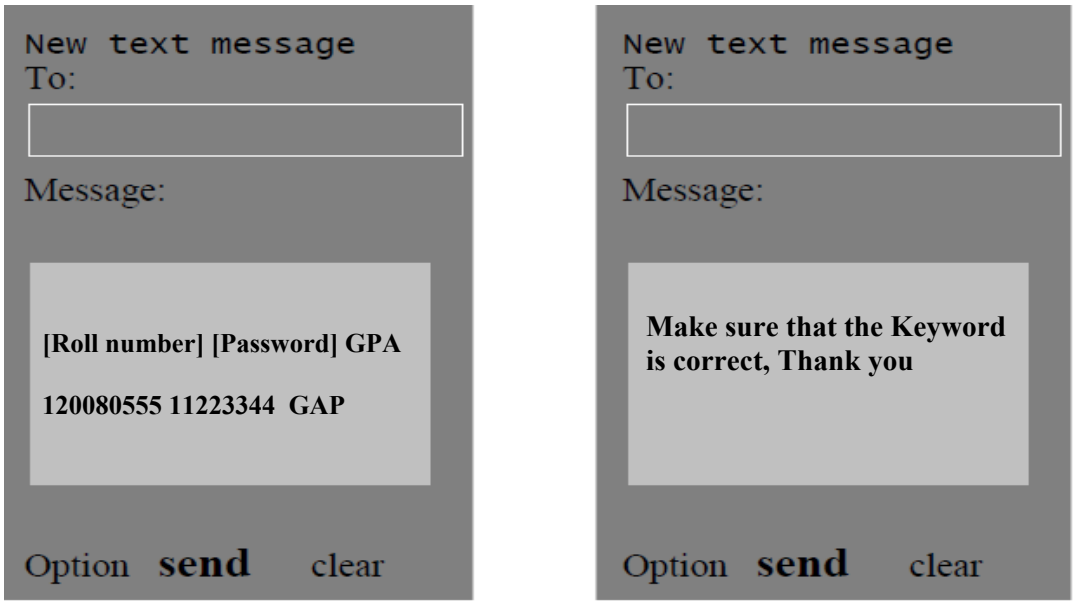
Request **Answer**

Figure (3.18): Request for GPA in SMS User Interface System "Correct Roll Number, Password and there are enough points"



Request **Answer**

Figure (3.19): Request for GPA in SMS User Interface System "Incorrect Roll Number or Password"



Request **Answer**

Figure (3.20): Request for GPA in SMS User Interface System "Incorrect Keyword"

3.8 Advantages of SMS User Interface System

The advantages of SMS User Interface System are the same with that of any other SMS application.

i. Convenience: Users access their academic information at their own convenience.

ii. Accessibility: Users can access their academic information from any location (as long as they are within a network service reception area).

iii. Portability: Services can be received and checked from any GSM phone. All GSM phones support SMS.

iv. Saves time: SMS is on the fly. As websites are sometimes unavailable due to congestion or server down time. SMS provides a faster means of sending and receiving such information.

v. Cheaper: SMS is generally economical, and it sometimes is provided as a free service (at least for certain periods) by the service provider.

vi. Less human resources required: Results are processed automatically

vii. Mobility: It is obvious that most mobile phone users have their phones with them everywhere they go; most people often leave their computer at home or work, but they will always have their phone on them.

3.9 Limitations of SMS User Interface System:

The limitations of SMS results are the same with that SMS application in general:

- **i.** As a rule, length of a SMS message is 160 characters. This is a limitation in SMS technology. Therefore the messages are abbreviated depending on the availability of the space.
- **ii.** The SMS technology (like email) does not guarantee set transmission times or guaranteed delivery of the message; therefore some messages may be delayed, blocked, or lost in transmission.
- **iii.** The cost of the message might be transferred to the sender (although toll-free lines can be acquired) and this is network dependent. It is also possible to reimburse such cost and to operate volume based tariffs.
- **iv.** Service operators might not have coverage in some areas, and some locations may be having mobile-phone jammers therefore preventing users from getting service signals.
- **v.** Not all students will have a mobile phone. This is negligible considering the amount of mobile phone owners; at least one person in a family will own a phone.
- **vi.** The phone may have a low battery at the point of delivery to a student whereby the phone is switched off.

CHAPTER FOUR
METHODOLOGY

This chapter consists of the following sections:

CHAPTER FOUR
METHODOLOGY

4.1 Introduction

This chapter describes the methodology that was used in this research. The adopted methodology to accomplish this research uses the following techniques: the information about the research design, research population, questionnaire design, statistical data analysis, content validity and pilot study.

4.2 Research Design

The first phase of the research thesis proposal included identifying and defining the problems and establishment objective of the research and development research plan.

The second phase of the research included a summary of the comprehensive literature review. Literatures on claim management were reviewed.

The third phase of the research included a field survey which was conducted with the Improved SMS User Interface to Support University Services "Case Study on Islamic University of Gaza (IUG)"

The fourth phase of the research focused on the modification of questionnaire design, through distributing the questionnaire to pilot study, The purpose of the pilot study was to test and prove that the questionnaire questions are clear to be answered in a way that help to achieve the target of the research. The questionnaire was modified based on the results of the pilot study.

The fifth phase of the research focused on distributing questionnaire and data analysis and discussion. This questionnaire was used to collect the required data in order to achieve the research objective. SPSS was used to perform the required analysis

The sixth phase of the research includes the conclusions ,recommendations and future works.

1200 questionnaires were distributed to the research population and **1188 questionnaires** are received. Figure (4.1) shows the methodology flowchart, which leads to achieve the research objective.

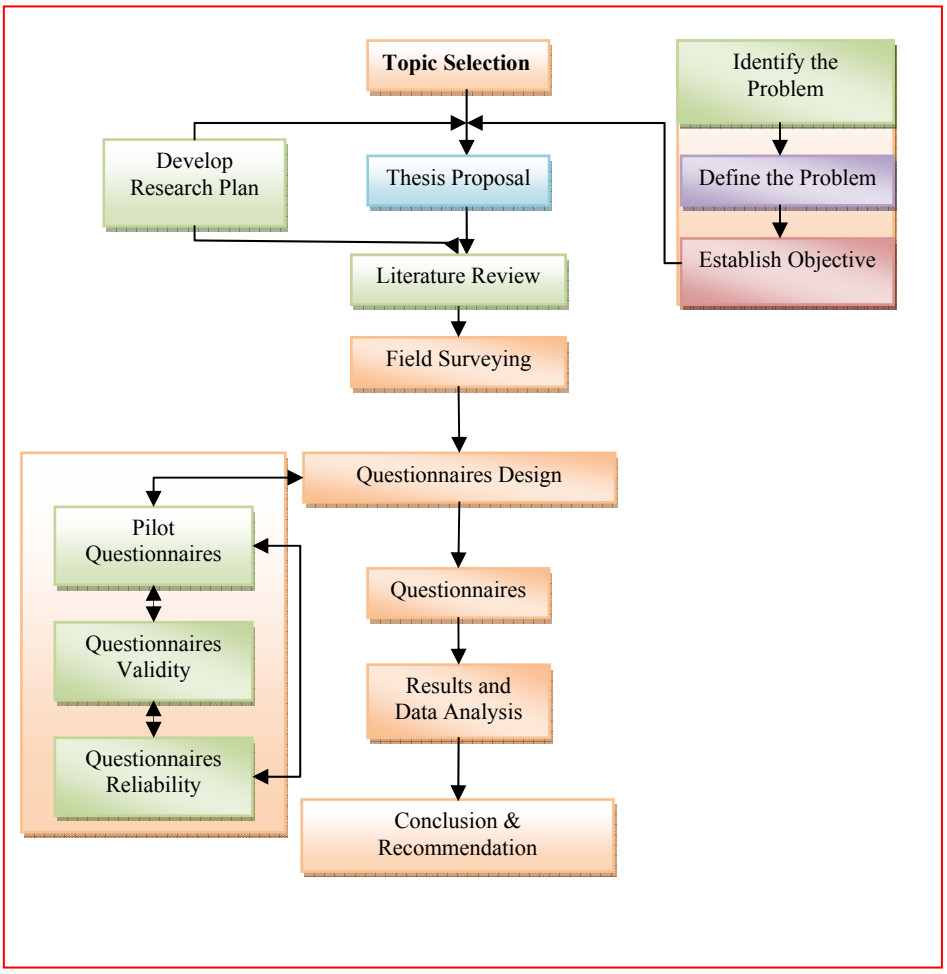


Figure (4.1): Illustrates the methodology flow chart.

4.3 Research methodology

4.3.1 Data Collection Methodology

In order to collect the needed data for this research, we use the secondary resources in collecting data such as books, journals, statistics and web pages, in addition to preliminary resources that not available in secondary resources through distribute questionnaires on research population in order to get their opinions about the impression of the employees about An Improved SMS User Interface to Support University Services "Case Study On Islamic University Of Gaza (IUG)". Research methodology depends on the analysis of data on the use of descriptive and analytical analysis, which depends on the poll and use the main program SPSS.

4.3.2 Population and sample size

The research sample was one sample includes students of IUG. There are almost 18,206 students at IUG including 6,723 male students and 11,483 female students (IUG, 2011).

Kasiulevicius et. al., (2006) indicate that Yamane (1967) provides a simplified formula to calculate sample sizes according to the following law: $N = \frac{NP}{1 + (NP \times e^2)}$

Where:

N: Sample size

NP: Is the size of population

E: Is the level of precision errors= 0.05

After applying the previous law, it is clear that the sample size will be 380 male students and 387 female students. Total questionnaires will be distributed equal to 767 questionnaires. The questionnaire distributed equal 1200, and 1188 questionnaires fit for study was obtained. So the recovery rate of questionnaires is equal to 99%. The following tables illustrated the properties of the samples.

4.3.2.1 Gender

Table (4.1) shows the sample gender proportion.

Table (4.1): Sample Gender proportion

Gender	Frequency	Percentages
Male	552	46.5
Female	636	53.5
Total	1188	100.0

Table (4.1) shows that 46.5 % from the sample are “Male” and 53.5 % from the sample are “Female”, this is consistent with the ratio of female to male students in IUG, where there are 18,206 students including 6,723 male students and 11,483 female students **4.3.2.2 Age**

Table (4.2) shows the sample ages.

4.3.2.2 Age

Table (4.2) shows the sample age proportion

Table (4.2): Shows the sample ages

Age	Frequency	Percentages
18-25 years	1124	94.6
Above 26 years	64	5.4
Total	1188	100.0

Table (4.2) show that 94.6 % from the sample ages from "18-25 years”, and 5.4% from the sample ages from” Above 26 years”. , this is consistent with the ratio of student ages in IUG, where the students finishing their secondary schools aged 18 years old and finishing their higher education aged 25 years old, also according to IUG (2011) the proportion of IUG students age (18-25) years is equal to 92% and for age (Above 26) years is equal to 8%.

4.3.2.3 Residence

Table (4.3) shows the sample residence.

Table (4.3): Shows the sample residence

Residence	Frequency	Percentages
Gaza North Province	188	15.8
Gaza Province	536	45.1
Gaza Middle Province	188	15.8
Khan Youns Province	173	14.6
Rafah Province	103	8.7
Total	1188	100.0

Table(4.3) shows that 15.8% from the sample from Residence at " Gaza North Province ", and 45.1% from the sample from Residence at " Gaza Province ", and 18.8 % from the sample from Residence at " Gaza Middle Province ", and 14.6% from the sample from Residence at " Khan Youns Province ", and 8.7% from the sample from Residence at " Rafah Province ".

4.3.2.4 Educational Background level

Table (4.4) shows the sample educational background level.

Table (4.4): Shows the sample educational background level

Educational Background	Frequency	Percentages
First-Year Undergrad	352	29.6
Second-Year Undergrad	275	23.1
Third-Year Undergrad	247	20.8
Fourth-Year Undergraduate	213	17.9
Fifth-year Undergraduate	35	2.9
First-Year Master's Student	35	2.9
Second-Year Master's Student	26	2.2
Other	5	0.4
Total	1188	100.0

Table (4.4) shows that 29.6% from the sample the educational background are " First-Year Undergrad " , and23.1% from the sample the educational background are "

Second-Year Undergrad " , and20.8% from the sample the educational background are " Third-Year Undergrad " , and17.9% from the sample the educational background are " Fourth-Year Undergraduate " , and2.9% from the sample the educational background are " Fifth-year Undergraduate " , and2.9% from the sample the educational background are " First-Year Master's Student " , and 2.2% from the sample the educational background are " Second-Year Master's Student " , and 0.4% from the sample the educational background are " Other " , this is consistent with the proportion ratio of IUG (2011) statistics to IUG students educational background level, as shown in table (4.5).

Table (4.5): Shows the IUG students educational background level

Educational Background	Percentages
First-Year Undergrad	25.1
Second-Year Undergrad	20.9
Third-Year Undergrad	20
Fourth-Year Undergraduate	25
Fifth-year Undergraduate	3.0
First-Year Master's Student	3.0
Second-Year Master's Student	2.8
Other	0.2
Total	100.0

After comparing both table (4.4) and table (4.5) it was clear that the sample was chosen are representative to all IUG students.

4.3.3 Mobile Phone

4.3.3.1 Mobile phone distribution

Table (4.6) shows mobile phone distribution among the sample

Table (4.6): Shows mobile phone distribution among the sample

Do you have a mobile phone	Frequency	Percentages
Yes	1163	97.9
No	25	2.1
Total	1188	100.0

Table (4.6) shows that 97.9% from the sample have a mobile phone, but 2.1% from the sample do not have a mobile phone. That means the significantly spread of mobile technology for all members of the sample, which lead to an important of this research.

4.3.3.2 Latest facilities the sample are aware of

Table (4.7) shows the latest facilities the sample is aware of.

Table (4.7): The latest facilities the sample is aware of:

Latest facilities which you are aware of	Frequency	Percentages
SMS	1088	91.6
MMS	9	0.8
GPRS	26	2.2
Email	23	1.9
Other	42	3.5
Total	1188	100.0

Table (4.7) shows that 91.6 % from the sample agrees that the Latest facilities are " SMS " , and 0.8 % from the sample agrees that the Latest facilities are " MMS " , and 2.2% from the sample agrees that the Latest facilities are " GPRS " , and 1.9% from the sample agrees that the Latest facilities are " Email " , and 3.5 % from the sample agrees that the Latest facilities are " Others ".

The researcher attributes this to lack of students' knowledge of mobile services, not every mobile phone can use these services, to use these services the student must activate these services facility and to high services price, therefore SMS is the simplest, most used and most user-friendly applications among students compared to other mobile technologies. SMS has been labeled the killer application of mobile phones as its usage has surpassed all expectations, which lead to an important of this research.

4.3.3.3 Average SMS utilization

Table (4.8) shows the sample average SMS utilization.

Table (4.8): Average monthly SMS utilization

What is your average monthly SMS utilization	Frequency	Percentages
0-9 **SMS**	399	33.6
10-19 **SMS**	323	27.2
20-29 **SMS**	193	16.2
30 and above **SMS**	273	23.0
Total	1188	100.0

Table (4.8) shows that 33.6% from the sample there's average monthly SMS utilization between " 0-9 SMS " , and 27.2% from the sample there's average monthly SMS utilization between " 10-19 SMS " , 16.2and % from the sample there's average monthly SMS utilization between " 20-29 SMS " , and 23.0% from the sample there's average monthly SMS utilization between " 30 and above SMS " . The researcher attributes high percentage of the sample average monthly SMS utilization between " 30 and above SMS " because recently SMS has been leveraged to provide several services like banking services, and commercial services.

4.3.3.4 The effectiveness of SMS in higher education

Table (4.9) shows the effectiveness of SMS in higher education through the sample viewpoints.

Table (4.9): The effectiveness of SMS in higher education

Do you think SMS will be useful in education	Frequency	Percentages
Yes	1071	90.2
No	117	9.8
Total	1188	100.0

Table (4.9) shows that 90.2% from the sample think that SMS will be useful in learning, and 9.8 % from the sample think that SMS will not be useful in learning.

The researcher attributes 9.8% to lack of students' knowledge of SMS User interface system and 90.2% leads to the importance of the research.

4.3.4 Internet

4.3.4.1 Internet Usage

Table (4.10) shows the percentage of the sample who owns a computer (Desktop or Laptop) with an internet connection.

Table (4.10): Do you own a computer (Desktop or Laptop) with an internet connection?

Do you own a computer (Desktop or Laptop) with an internet connection	Frequency	Percentages
Yes	816	68.7
No	372	31.3
Total	1188	100.0

Table (4.10) show that 68.7% from the sample own a computer (Desktop or Laptop) with an internet connection but 31.3% from the sample not own a computer (Desktop or Laptop) with an internet connection. Through these results we note that there are students who do not have a computer (Desktop or Laptop). Therefore developing a system to help students to communicate with all the university services via their cellular phones is being a must.

4.3.4.2 Frequency of internet usage to enter IUG web page

Table (4.11) shows frequency of internet usage to enter IUG web page.

Table (4.11): Frequency of internet usage to enter IUG web page

Frequency of Internet usage to enter IUG web page	Frequency	Percentages
Daily	179	15.1
Weekly	514	43.3
Monthly	281	23.7
Rarely	214	18.0
Total	1188	100.0

Table (4.11) shows that 15.1% from the sample the Frequency of Internet usage to enter IUG web page are " Daily ", and 43.3 % from the sample the Frequency of Internet usage to enter IUG web page are " Weekly ", and 23.7% from the sample the Frequency of Internet usage to enter IUG web page are " Monthly ", and 18.0% from the sample the Frequency of Internet usage to enter IUG web page are " Rarely ". Through these results we note that there are students who rarely or do not log to university website. Therefore developing a system to help students to communicate with all the university services via their cellular phones preventing them from accessing the University website is being a must. Also several benefits can be achieved by applying this system, such as save time, save efforts; moreover such system will increase flexibility.

4.4 Questionnaire content

The questionnaire was provided with a covering letter explaining the purpose of the study, the way of responding, the aim of the research and the security of the information in order to encourage a high response. The questionnaire included multiple choice questions: which used widely in the questionnaire, the variety in these questions aims first to meet the research objectives, and to collect all the necessary data that can support the discussion, results and recommendations in the research.

The sections in the questionnaire will verify the objectives in this research related to An Improved SMS User Interface to Support University Services “Case Study on Islamic University of Gaza (IUG)” as the following:

1- Respondent profile consist from 7 questions
2- SMS User Interface System Evaluation consist from 15 questions
3- assess benefits and Student Satisfaction for An Improved SMS User Interface system and consist from 5 questionsand all questions follows using the following semantics differential scale as the following:

Level	**Strongly agree**	➔➔➔➔➔➔➔➔➔➔➔➔➔➔	**Strongly disagree**
Scale	10	➔➔➔➔➔➔➔➔➔➔➔➔➔➔	1

4.5 Pilot Study

A pilot study for the questionnaire was conducted before collecting the results of the sample. It provides a trial run for the questionnaire, which involves testing the wordings of question, identifying ambiguous questions, testing the techniques that used to collect data, and measuring the effectiveness of standard invitation to respondents.

4.6 Validity of the Research

We can define the validity of a questionnaire as a determination of the extent to which a questionnaire actually reflects the abstract construct being examined. "Validity refers to the degree to which a questionnaire measures what it is supposed to be measuring". High validity is the absence of systematic errors in the measuring.

When a questionnaire is valid; it truly reflects the concept it is supposed to measure. Achieving good validity required the care in the research questionnaire design and sample selection. The amended questionnaire was by the supervisor and five expertise in the tendering and bidding environments to evaluate the procedure of questions and the method of analyzing the results. The expertise agreed that the questionnaire was valid and suitable enough to measure the purpose that the questionnaire designed for.

4.7 Content Validity of the Questionnaire

Content validity test was conducted by consulting two groups of experts. The first was requested to evaluate and identify whether the questions agreed with the scope of the items and the extent to which these items reflect the concept of the research problem. The other was requested to evaluate that the instrument used is valid statistically and that the questionnaire was designed well enough to provide relations and tests between variables. The two groups of experts did agree that the questionnaire was valid and suitable enough to measure the concept of interest with some amendments.

4.8 Statistical Validity of the Questionnaire

To insure the validity of the questionnaire, two statistical tests should be applied. The first test is Criterion-related validity test (Pearson test) which measures the correlation coefficient between each item in the field and the whole field. The second test is structure validity test (Pearson test) that used to test the validity of the questionnaire structure by testing the validity of each field and the validity of the whole questionnaire. It measures the correlation coefficient between one filed and all the fields of the questionnaire that have the same level of similar scale.

4.9 Criterion Related Validity

4.9.1 Internal consistency

Internal consistency of the questionnaire is measured by a scouting sample, which consisted of fifty questionnaires, through measuring the correlation coefficients between each paragraph in one field and the whole filed. A table (4.12) and (4.13) shows the correlation coefficient and p-value for each field items.

Table (4.12): The correlation coefficient between each paragraph in the field and the whole field (SMS User Interface System Evaluation)

No.	Questions	Pearson coefficient	p-value
1	SMS User Interface System is appropriate with IUG strategic vision.	0.682	0.000
2	I would find that using SMS User Interface System is a good modern idea.	0.762	0.000
3	I would find that using SMS User Interface System for registration is more effective	0.660	0.000
4	It would find it simple to use SMS User Interface System.	0.798	0.000
5	I would find the registry service through SMS User Interface System assists and complements the registry service on the internet.	0.823	0.000
6	I would find it easy to use SMS User Interface System to get what I want.	0.699	0.000

Continued Table (4.12): The correlation coefficient between each paragraph in the field and the whole field (SMS User Interface System Evaluation)

No.	Question	Pearson coefficient	p-value
7	My feeling will be comfortable using SMS User Interface System.	0.783	0.000
8	I like using SMS User Interface System.	0.772	0.000
9	It will be easy to learn SMS User Interface System error messages that clearly tell me how to fix problems.	0.696	0.000
10	The information provided by SMS User Interface System will be easy to understand.	0.813	0.000
11	SMS User Interface system will help me to communicate with all university services at any place	0.857	0.000
12	I would find that SMS User Interface System is considering as user friendly than using internet.	0.763	0.000
13	The organization of information on the SMS User Interface System will be clear .	0.800	0.000
14	I would find that SMS User Interface System would lead to rapidly obtain the required information.	0.721	0.000
15	Overall, I will be satisfied with this SMS User Interface System.	0.764	0.000

As show in the table the p- Values are less than 0.05 or 0.01, so the correlation coefficients of this field are significant at $\alpha = 0.01$ or $\alpha = 0.05$, so it can be said that the paragraphs of this field are consistent and valid to be measure what it was set for.

Table (4.13): The correlation coefficient between each paragraph in the field and the whole field (Assess benefits and Student Satisfaction for An Improved SMS User Interface system)

No.	Questions	Pearson coefficient	p-value
1	Using SMS User Interface System will save my time.	0.953	0.000
2	Using SMS User Interface System will save my efforts.	0.963	0.000
3	Using the current technology with SMS User Interface System will enhance my knowledge.	0.862	0.000
4	Using this SMS User Interface System would be very effective in registry services.	0.919	0.000
5	Using this SMS User Interface System will be a new way to communicate with students.	0.932	0.000

As show in the table the p- Values are less than 0.05 or 0.01, so the correlation coefficients of this field are significant at $\alpha = 0.01$ or $\alpha = 0.05$, so it can be said that the paragraphs of this field are consistent and valid to be measure what it was set for.

4.9.2 Structure Validity of the Questionnaire

Structure validity is the second statistical test that used to test the validity of the questionnaire structure by testing the validity of each field and the validity of the whole questionnaire. It measures the correlation coefficient between one filed and all the fields of the questionnaire that have the same level of scale. Table (4.14) shows the structure validity of the questionnaire

Table (4.14): Structure Validity of the Questionnaire

Number	**Section**	Pearson **correlation coefficient**	**p-value**
1	SMS User Interface System Evaluation	0.975	0.000
2	assess benefits and Student Satisfaction for An Improved SMS User Interface system	0.844	0.000

As shown in table (4.14), the significance values are less than 0.05 or 0.01, so the correlation coefficients of all the fields are significant at $\alpha = 0.01$ or $\alpha = 0.05$, so it can be said that the fields are valid to be measured what it was set for to achieve the main aim of the research.

4.10 Reliability of the Research

Reliability of a questionnaire is the degree of consistency with which it measures the attribute it is supposed to be measuring. The test is repeated to the same sample of students on two occasions and then compares the scores obtained by computing a reliability coefficient. For the most purposes reliability coefficient above 0.7 are considered satisfactory. Period of two weeks to a month is recommended between two tests Due to complicated conditions that the contractors is facing at the time being, it was too difficult to ask them to respond our questionnaire twice within short period. The statistician's explained that, overcoming the distribution of the questionnaire twice to measure the reliability can be achieved by using Kronpakh Alpha coefficient and Half Split Method through the SPSS software.

4.11 Half Split Method

This method depends on finding Pearson correlation coefficient between the means of odd rank questions and even rank questions of each field of the questionnaire. Then, correcting the Pearson correlation coefficients can be done by using Spearman Brown correlation coefficient of correction. The corrected correlation coefficient (consistency coefficient) is computed according to the following equation: Consistency coefficient = 2r/(r+1), where r is the Pearson correlation coefficient. The normal range of corrected correlation coefficient 2r/(r+1) is between 0.0 and + 1.0. Table (4.15): Split-Half shows coefficient method

Table (4.15): Split-Half Coefficient method

Number	Section	person-correlation	Spearman-Brown Coefficient	Sig. (2-Tailed(
1	SMS User Interface System Evaluation	0.7224	0.8388	0.0000
2	assess benefits and Student Satisfaction for An Improved SMS User Interface system	0.9224	0.9596	0.0000
	Total	0.7455	0.8542	0.0000

As shown in table (4.15), all the corrected correlation coefficients values are between 0.854 and 0.848 and the general reliability for all items equal 0.821, and the significant (α) is less than 0.05 so all the corrected correlation coefficients are significance at α = 0.05. It can be said that according to the Half Split method, the dispute causes group are reliable.

4.12 Cronbach's Coefficient Alpha

This method is used to measure the reliability of the questionnaire between each field and the mean of the whole fields of the questionnaire. The normal range of Cronbach's coefficient alpha value between 0.0 and + 1.0, and the higher values reflects a higher degree of internal consistency.

Table (4.16): Reliability Cronbach's Alpha

Number	Section	No. of Items	Cronbach's Alpha
1	SMS User Interface System Evaluation	15	0.9490
2	assess benefits and Student Satisfaction for An Improved SMS User Interface system	5	0.9581
	Total	20	0.9590

As shown in table (4.16) the Cronbach's coefficient alpha was calculated for the first field of the causes of claims, the second field of common procedures and the third field of the Particular claims. The results were in the range from 0.9490 and 0.9581, and the general reliability for all items equal 0.9590. This range is considered high; the result ensures the reliability of the questionnaire.

4.13 Statistical Manipulation

To achieve the research goal, researcher used the statistical package for the Social Science (SPSS) for Manipulating and analyzing the data.

Statistical methods are as follows:

1- Frequencies and Percentile.
2- Alpha- Cronbach's Test for measuring reliability of the items of the questionnaires.
3- Person correlation coefficients for measuring validity of the items of the questionnaires.
4- Spearman –Brown Coefficient.
5- One sample T test.
6- Independent samples T test.
7- One way ANOVA.

CHAPTER FIVE
RESEARCH ANALYSIS AND FINDINGS

This chapter consists of the following section:

5.1 Introduction

5.2 One Sample K-S Test

5.3 Discussion and hypotheses test

CHAPTER FIVE

RESEARCH ANALYSIS AND FINDINGS

5.1 Introduction

This chapter will analyze the results of the key responses of An SMS User Interface System to Support University Services.

5.2 One Sample K-S Test

One Sample K-S test will be used to identify if the data follow normal distribution or not, this test is considered necessary in case testing hypotheses as most parametric Test stipulate data to be normality distributed and this test used when the size of the sample are greater than 50. Table (5.1) shows One Sample K-S to identify if the data follow normal distribution or not.

Table (5.1): One Sample K-S

Number	Section	Items No.	Statistic	P-value
1	SMS User Interface System Evaluation	15	1.313	0.064
2	assess benefits and Student Satisfaction for An Improved SMS User Interface system	5	0.886	0.412
	Total	20	1.063	0.208

Results test as shown in table (5.1) clarifies that the calculated p-value is greater than the significant level which is equal 0.05 (p-value. > 0.05), this in turn denotes that data follows normal distribution, and so parametric tests must be used.

5.3 Discussion and hypotheses test

In the following tables We use a one sample t test to test if the opinion of the respondent in the content of the sentences are positive (weight mean greater than "60%" and the p-value less than 0.05) or the opinion of the respondent in the content of the sentences are neutral (p- value is greater than 0.05) or the opinion of the respondent in the content of the sentences are negative (weight mean less than "60%" and the p-value less than 0.05)

5.3.1 Hypothesis1

An Improved SMS User Interface System evaluation at significant level α =0.05

We use a one sample t test to test the efficiency of SMS User Interface System and student's satisfaction at significant level α =0.05 and the results shown in table (5.2) as follows:

Table (5.2): SMS User Interface System Evaluation

No.	Items	Mean	Standard Deviation	Weight Mean	t-value	P-value
1	SMS User Interface System is appropriate with IUG strategic vision.	7.26	2.641	72.58	16.347	0.000
2	I would find that using SMS User Interface System is a good modern idea.	7.76	2.528	77.56	23.795	0.000
3	I would find that using SMS User Interface System for registration is more effective	7.58	2.632	75.78	20.431	0.000
4	It would find it simple to use SMS User Interface System.	7.27	2.591	72.72	16.673	0.000
5	I would find the registry service through SMS User Interface System assists and complements the registry service on the internet.	7.29	2.612	72.90	16.705	0.000
6	I would find it easy to use SMS User Interface System to get what I want.	6.81	2.833	68.08	9.662	0.000
7	My feeling will be comfortable using SMS User Interface System.	6.91	2.740	69.07	11.233	0.000
8	I like using SMS User Interface System.	7.10	2.791	70.99	13.256	0.000
9	It will be easy to learn SMS User Interface System error messages that clearly tell me how to fix problems.	6.37	2.663	63.71	4.738	0.000
10	The information provided by SMS User Interface System will be easy to understand.	7.18	2.499	71.76	15.982	0.000

Continued Table (5.2): SMS User Interface System Evaluation

No.	Items	Mean	Standard Deviation	Weight Mean	t-value	P-value
11	SMS User Interface system will help me to communicate with all university services at any place	7.69	2.661	76.85	21.600	0.000
12	I would find that SMS User Interface System is considering as user friendly than using internet.	6.94	2.790	69.38	11.491	0.000
13	The organization of information on the SMS User Interface System will be clear .	7.15	2.532	71.53	15.585	0.000
14	I would find that SMS User Interface System would lead to rapidly obtain the required information.	7.59	2.675	75.93	20.296	0.000
15	Overall, I will be satisfied with this SMS User Interface System.	7.95	2.649	79.48	25.057	0.000
	Total	7.25	1.983	72.49	21.668	0.000

*Critical value of **t** at df "1187" and significance level 0.05 equal 1.96*

1- In item No. (15) the weight mean equal " 79.48%" and p-value equal " 0.000" which is less than 0.05, that means overall, the students will be satisfied with SMS User Interface System.

2- In item No. (2) the weight mean equal " 77.56%" and p-value equal " 0.000" which is less than 0.05, that means the students would find that using SMS User Interface System is a good modern idea.

3- In item No. (11) the weight mean equal " 76.85%" and p-value equal " 0.000" which is less than 0.05, that means SMS User Interface system will help students to communicate with all university services at any place.

4- In item No. (14) the weight mean equal " 75.93%" and p-value equal " 0.000" which is less than 0.05, that means the students will find that SMS User Interface System would lead to rapidly obtain the required information.

5- In item No. (3) the weight mean equal " 75.78%" and p-value equal " 0.000" which is less than 0.05, that means the students find that using SMS User Interface System for registration is more effective.

6- In item No. (5) the weight mean equal " 72.90%" and p-value equal " 0.000" which is less than 0.05, that means the student will find the registry service through SMS User Interface System assists and complements the registry service on the internet.

7- In item No. (4) the weight mean equal " 72.72%" and p-value equal " 0.000" which is less than 0.05, that means the students will find it simple to use SMS User Interface System.

8- In item No. (1) the weight mean equal " 72.58%" and p-value equal " 0.000" which is less than 0.05, that means SMS User Interface System is appropriate with IUG strategic vision.

9- In item No. (10) the weight mean equal " 71.76%" and p-value equal " 0.000" which is less than 0.05, that means the information provided by SMS User Interface System will be easy for students to understand.

10- In item No. (13) the weight mean equal " 71.53%" and p-value equal " 0.000" which is less than 0.05, that means the organization of information on the SMS User Interface System will be clear for students.

11- In item No. (8) the weight mean equal " 70.99%" and p-value equal " 0.000" which is less than 0.05, that means the students like using SMS User Interface System.

12- In item No. (12) the weight mean equal " 69.38%" and p-value equal " 0.000" which is less than 0.05, that means the students will find SMS User Interface System more user friendly than using internet.

13- In item No. (7) the weight mean equal " 69.07%" and p-value equal " 0.000" which is less than 0.05, that means the students feeling will be comfortable using SMS User Interface System.

14- In item No. (6) the weight mean equal " 68.08%" and p-value equal " 0.000" which is less than 0.05, that means the students will find SMS User Interface System easy to get what they want.

15- In item No. (9) the weight mean equal " 63.71%" and p-value equal " 0.000" which is less than 0.05, that means it will be easy for students to learn SMS User Interface System error messages which will tell them clearly how to fix problems.

For general the results for all items of the fields, it was shown that the average mean equal 7.25 and the weight mean equal 72.49% which is greater than "60%" and the value of t test equal 21.668 which is greater than the critical value which is equal 1.96 and the p- value equal 0.000 which is less than 0.05, this means that the students are satisfied with SMS User Interface System Evaluation at significant level α =0.05

5.3.2 Hypothesis2

Assess benefits and Student Satisfaction for An Improved SMS User Interface system at significant level α =0.05

We use a one sample t test to test benefits and Student Satisfaction for An Improved SMS User Interface system at significant level α =0.5 and the results shown in table (5.3) as follows:

Table (5.3): Assess benefits and Student Satisfaction for An Improved SMS User Interface system

No.	Items	Mean	Standard Deviation	Weight Mean	t-value	P-Value
1	Using SMS User Interface System will save my time.	8.11	2.452	81.08	29.339	0.000
2	Using SMS User Interface System will save my efforts.	8.22	2.249	82.24	33.634	0.000
3	Using the current technology with SMS User Interface System will enhance my knowledge.	7.71	2.402	77.07	24.128	0.000
4	Using SMS User Interface System would be very effective in registry services.	7.71	2.447	77.07	23.739	0.000
5	Using SMS User Interface System will be a new way to communicate with students.	8.12	2.370	81.22	30.489	0.000
	Total	7.97	2.075	79.73	32.437	0.000

*Critical value of **t** at df "1187" and significance level 0.05 equal 1.96*

1. In item No. (2) the weight mean equal " 82.24%" and p-value equal " 0.000" which is less than 0.05, that means the students are satisfied that using SMS User Interface System will save their efforts.
2. In item No. (5) the weight mean equal " 81.22%" and p-value equal " 0.000" which is less than 0.05, that means the students are satisfied that using SMS User Interface System will be a new way to communicate with all university services.
3. In item No. (1) the weight mean equal " 81.08%" and p-value equal " 0.000" which is less than 0.05, that means the students are satisfied that using SMS User Interface System will save their time.
4. In item No. (4) the weight mean equal " 77.07%" and p-value equal " 0.000" which is less than 0.05, that means the students are satisfied that using SMS User Interface System would be very effective in registry services.
5. In item No. (3) the weight mean equal " 77.07%" and p-value equal " 0.000" which is less than 0.05, that means the students are satisfied that using the current technology with SMS User Interface System will enhance their knowledge.

For general the results for all items of the field, it was shown that the average mean equal 7.97 and the weight mean equal 79.73% which is greater than "60%" and the value of t test equal 32.437 which is greater than the critical value which is equal 1.96 and the p- value equal 0.000 which is less than 0.05, that means that the students are satisfied for An Improved SMS User Interface system benefits at significant level α =0.05.

5.3.2.1 Sub hypothesis 1:

There is a significant differences at level α =0.5 about the An Improved SMS User Interface to Support University Services due to sex

To test the hypothesis we use the Independent Samples Test and the result illustrated in table (5.4).

Table (5.4): Independent Samples Test for difference in point of view up to an improved SMS User Interface to Support University Services due to sex

Field	Sex	N	Mean	Std. Deviation	T	P-value
SMS User Interface System Evaluation	**Male**	551	7.264	1.932	0.245	0.806
	Female	632	7.236	2.027		
Assess benefits and Student Satisfaction for An Improved SMS User Interface system	**Male**	547	7.861	2.089	-1.736	0.083
	Female	617	8.072	2.059		
An Improved SMS User Interface to Support University Services	**Male**	551	7.412	1.886	-0.228	0.819
	Female	632	7.438	1.952		

*Critical value of **t** at df "1186" and significance level 0.05 equal 1.96*

Table (5.4) shows that the p-value equal 0.819 which is greater than 0.05 and the absolute value of T test equal 0.228 which is less than the value of critical value which is equal 1.96, that's means there is no significant differences at level α =0.05 about An Improved SMS User Interface to Support University Services due to sex which means that there is no differences between female and male students trends.

5.3.2.2 Sub hypothesis 2:

There is a significant differences at level α =0.05 about an improved SMS User Interface to Support University Services due to age

To test the hypothesis we use the Independent Samples Test and the result illustrated in table (5.5).

Table (5.5): Independent Samples Test for difference in point of view up to an improved SMS User Interface to Support University Services due to age

Field	Age	N	Mean	Std. Deviation	T	P-value
SMS User Interface System Evaluation	18-25	1119	7.238	2.007	-0.800	0.424
	Above 26 years	64	7.442	1.487		
Assess benefits and Student Satisfaction for An Improved SMS User Interface system	18-25	1100	7.963	2.090	-0.664	0.507
	Above 26 years	64	8.141	1.813		
An Improved SMS User Interface to Support University Services	18-25	1119	7.415	1.944	-0.812	0.417
	Above 26 years	64	7.615	1.462		

Critical value of **t** at df "1186" and significance level 0.05 equal 1.96

Table (5.5) shows that the p-value equal 0.417 which is greater than 0.05 and the absolute value of T test equal 0.812 which is less than the value of critical value which is equal 2.02, that's means there is no significant differences at level α =0.5 about the An Improved SMS User Interface to Support University Services due to age.

5.3.2.3 Sub hypothesis 3

There is a significant differences at level α =0.05 about an improved SMS User Interface to Support University Services due to residence.

To test the hypothesis we use the one way ANOVA and the result illustrated in table (5.6).

Table (5.6): One way ANOVA test for difference in point of view up to an improved SMS User Interface to Support University Services due to residence

Field	Source	Sum of Squares	Df	Mean Square	F value	Sig.(P-Value)
SMS User Interface System Evaluation	Between Groups	56.332	4	14.083	3.614	0.006
	Within Groups	4590.023	1178	3.896		
	Total	4646.355	1182			
Assess benefits and Student Satisfaction for An Improved SMS User Interface system	Between Groups	60.997	4	15.249	3.572	0.007
	Within Groups	4948.026	1159	4.269		
	Total	5009.023	1163			
An improved SMS User Interface to Support University Services	Between Groups	55.498	4	13.875	3.795	0.005
	Within Groups	4306.833	1178	3.656		
	Total	4362.332	1182			

Critical value of F at df "4,1178" and significance level 0.05 equal 2.38

Table (5.6) shows that the p-value equal 0.005 which is less than 0.05 and the value of F test equal 3.795 which is greater than the value of critical value which is equal 2.38 , that's mean there is a significant difference at level α =0.05 about an improved SMS User Interface to Support University Services due to residence. Table (5.7) shows Scheffe test for multiple comparison due to residence.

Table (5.7): Scheffe test for multiple comparisons due to residence

FIELD	Difference	Gaza North Province	Gaza Province	Gaza Middle Province	Khan Youns Province	Rafah Province
SMS User Interface System Evaluation	Gaza North Province		0.341	0.443	-0.091	-0.150
	Gaza Province	-0.341		0.102	-0.432	-0.491
	Gaza Middle Province	-0.443	-0.102		-0.535	-0.594*
	Khan Youns Province	0.091	0.432	0.535		-0.059
	Rafah Province	0.150	0.491	0.594*	0.059	
Assess benefits and Student Satisfaction for An Improved SMS User Interface system	Gaza North Province		0.260	0.382	-0.225	-0.277
	Gaza Province	-0.260		0.121	-0.485	-0.538
	Gaza Middle Province	-0.382	-0.121		-0.606	-0.659*
	Khan Youns Province	0.225	0.485	0.606		-0.053
	Rafah Province	0.277	0.538	0.659*	0.053	
An Improved SMS User Interface to Support University Services	Gaza North Province		0.324	0.425	-0.111	-0.171
	Gaza Province	-0.324		0.101	-0.434	-0.495
	Gaza Middle Province	-0.425	-0.101		-0.536	-0.596*
	Khan Youns Province	0.111	0.434	0.536		-0.060
	Rafah Province	0.171	0.495	0.596*	0.060	

Table (5.7) shows that there is a difference between “Gaza Middle Province” and " Rafah Province " and the difference goes to " Rafah Province ". This is due to people culture difference between “Gaza Middle Province” and “Rafah Province “where people in “Gaza Middle Province “think there are a harmful effects of mobile.

5.3.2.4 Sub hypothesis 4

There is a significant differences at level α =0.05 about an improved SMS User Interface to Support University Services due to educational background.

To test the hypothesis we use the one way ANOVA and the result illustrated in table (5.8).

Table (5.8): One way ANOVA test for difference in point of view up to an improved SMS User Interface to Support University Services due to educational background level

Field	Source	Sum of Squares	df	Mean Square	F value	Sig.(P-Value)
SMS User Interface System Evaluation	Between Groups	24.667	7	3.524	0.896	0.509
	Within Groups	4621.688	1175	3.933		
	Total	4646.355	1182			
Assess benefits and Student Satisfaction for An Improved SMS User Interface system	Between Groups	29.056	7	4.151	0.964	0.456
	Within Groups	4979.967	1156	4.308		
	Total	5009.023	1163			
An improved SMS User Interface to Support University Services	Between Groups	24.300	7	3.471	0.940	0.474
	Within Groups	4338.032	1175	3.692		
	Total	4362.332	1182			

Critical value of F at df "7,1175" and significance level 0.05 equal 2.02

Table (5.8) shows that the p-value equal 0.474 which is greater than 0.05 and the value of F test equal 0.940 which is less than the value of critical value which is equal to 2.02, that's mean there is no significant difference at level α =0.05 about an improved SMS User Interface to Support University Services due to educational background level.

5.3.2.5 Sub hypothesis 5

There is a significant differences at level α =0.05 about an improved SMS User Interface to Support University Services due to Latest facilities.

To test the hypothesis we use the one way ANOVA and the result illustrated in table (5.9).

Table (5.9): One way ANOVA test for difference in point of view up to an improved SMS User Interface to Support University Services due to Latest facilities

Field	Source	Sum of Squares	df	Mean Square	F value	Sig.(P-Value)
SMS User Interface System Evaluation	Between Groups	56.899	4	14.225	3.651	0.006
	Within Groups	4589.456	1178	3.896		
	Total	4646.355	1182			
Assess benefits and Student Satisfaction for An Improved SMS User Interface system	Between Groups	54.532	4	13.633	3.189	0.013
	Within Groups	4954.491	1159	4.275		
	Total	5009.023	1163			
An improved SMS User Interface to Support University Services	Between Groups	54.793	4	13.698	3.746	0.005
	Within Groups	4307.538	1178	3.657		
	Total	4362.332	1182			

Critical value of F at df "4,1178" and significance level 0.05 equal 2.38

Table (5.9) shows that the p-value equal 0.005 which is less than 0.05 and the value of F test equal 3.746 which is greater than the value of critical value which is equal 2.38, that's mean There is a significant difference at level α =0.05 about an improved SMS User Interface to Support University Services due to Latest facilities. Table (5.10) shows Scheffe test for multiple comparison due to Latest facilities.

Table (5.10): Scheffe test for multiple comparisons due to Latest facilities

FIELD	Difference	SMS	MMS	GPRS	Email	Other
SMS User Interface System Evaluation	SMS		0.714	0.748	0.059	1.003*
	MMS	-0.714		0.034	-0.656	0.289
	GPRS	-0.748	-0.034		-0.689	0.255
	Email	-0.059	0.656	0.689		0.944
	Other	-1.003*	-0.289	-0.255	-0.944	
Assess benefits and Student Satisfaction for An Improved SMS User Interface system	SMS		0.970*	0.973*	0.567	0.711*
	MMS	-0.970		0.003	-0.403	-0.259
	GPRS	-0.973	-0.003		-0.406	-0.262
	Email	-0.567	0.403	0.406		0.144
	Other	-0.711*	0.259	0.262	-0.144	
An Improved SMS User Interface to Support University Services	SMS		0.809	0.801	0.181	0.930*
	MMS	-0.809		-0.008	-0.628	0.121
	GPRS	-0.801	0.008		-0.619	0.130
	Email	-0.181	0.628	0.619		0.749
	Other	-0.930*	-0.121	-0.130	-0.749	

Table (5.10) shows that there is a difference between "SMS" and "others" and the difference goes to "SMS". Because SMS is the simplest, most used and most user-friendly applications compared to other mobile technologies. It has been labeled the killer application of mobile phones as its usage has surpassed all expectations.

5.3.2.6 Sub hypothesis 6

There is a significant differences at level α =0.05 about an improved SMS User Interface to Support University Services due to average monthly SMS utilization.

To test the hypothesis we use the one way ANOVA and the result illustrated in table (5.11).

Table (5.11): One way ANOVA test for difference in point of view up to an improved SMS User Interface to Support University Services due to average monthly SMS utilization

Field	Source	Sum of Squares	df	Mean Square	F value	Sig.(P-Value)
SMS User Interface System Evaluation	Between Groups	94.393	3	31.464	8.150	0.000
	Within Groups	4551.962	1179	3.861		
	Total	4646.355	1182			
Assess benefits and Student Satisfaction for An Improved SMS User Interface system	Between Groups	75.786	3	25.262	5.940	0.001
	Within Groups	4933.237	1160	4.253		
	Total	5009.023	1163			
An improved SMS User Interface to Support University Services	Between Groups	89.943	3	29.981	8.274	0.000
	Within Groups	4272.388	1179	3.624		
	Total	4362.332	1182			

Critical value of F at df "3,1179" and significance level 0.05 equal 2.61

Table (5.11) shows that the p-value equal 0.000 which is less than 0.05 and the value of F test equal 8.274 which is greater than the value of critical value which is equal 2.61, that's mean there is a significant difference at level α =0.05 about An Improved SMS User Interface to Support University Services due to average monthly SMS utilization. Table (5.12) shows Scheffe test for multiple comparison due to average monthly SMS utilization.

Table (5.12): Scheffe test for multiple comparisons due to average monthly SMS utilization

FIELD	Difference	0-9 SMS	10-19 SMS	20-29 SMS	30 SMS and above
SMS User Interface System Evaluation	0-9 SMS		-0.476	-0.526	-0.712*
	10-19 SMS	0.476		-0.051	-0.237
	20-29 SMS	0.526	0.051		-0.186
	30 SMS and above	0.712*	0.237	0.186	
Assess benefits and Student Satisfaction for An Improved SMS User Interface system	0-9 SMS		-0.552	-0.503	-0.551*
	10-19 SMS	0.552		0.049	0.002
	20-29 SMS	0.503	-0.049		-0.048
	30 SMS and above	0.551*	-0.002	0.048	
An Improved SMS User Interface to Support University Services	0-9 SMS		-0.499	-0.514	-0.681*
	10-19 SMS	0.499		-0.016	-0.183
	20-29 SMS	0.514	0.016		-0.167
	30 SMS and above	0.681*	0.183	0.167	

table (5.12) show that there is a difference between "0-9 SMS" and " 30 SMS and above " and the difference goes to "30 SMS and above" because recently SMS has been leveraged to provide several services like banking services, and commercial services.

CHAPTER SIX
CONCLUSIONS & RECOMMENDATIONS

This chapter consists of the following section:

CHAPTER SIX
CONCLUSIONS AND RECOMMENDATIONS

This research concentrates efforts to explore the potential of wireless technologies especially mobile technology to help students. This chapter will consolidate the main results of the previous chapters in the light of research problem and objectives and focuses on the conclusion and recommendation of this research. The conclusion will explain how this research achieves its goals according to the objectives and problem statement. Finally brief recommendations will be directed towards promoting the adoption and implementation of SMS User Interface System in Palestinian Universities. Suggestions obtained would be taken into consideration for future enhancements and implementation.

6.1 Conclusion

SMS User Interface System is widely available means of communication for most students. The use of this medium enhances easy access to academic services through cell phone. The research described the use of the student's Roll number with a password for accessing their academic services. SMS User Interface System tries to approach academic services from the point of social interaction between the students to improve the security to a certain level. This research tries to develop an open system which is based on trust so that students can access their academic services without being limited to a particular phone number.

The findings from the data analysis according to Descriptive Statistics table clearly indicate that IUG students' approval of communication between themselves and academic services through SMSs. Students were pleased, and/or pleasantly surprised to receive. They also indicate the suitability and reliability of SMS communication in instances where up-to date cell phone numbers are available. Students have also found it to be usable, beneficial, efficient and convenient since it achieves their major aim. The importance of regular updating of students information is, therefore, essential. Most of all, it can take students one step nearer to achieving "anytime, anywhere".

6.2 Recommendations

SMS User Interface System can help the students to get academic information from the actual source at their own convenient time through their cell phones.

To develop this system, the university must have:

1. Data Source - valuable information that students need to access anytime.
2. The databases can be in different places and connected to each other.
3. SMS server must have a software application to manage the SMS requests and query to the database.
4. E-Commerce website which will promote and manage the payment to use this service. It must have payment gateway to make things easier for the student. But it can also provide other ways to give the payment, such as bank transfer.
5. An agreement between the university and the cellular operators to provide the service to all students who are customers of different cellular operators.
6. Further work is still to be done on the security protocols.

6.3 Future Work

In order to improve the capability of An Improved SMS User Interface System future works can be undertaken to enhance the system as follow:

a) Improve prototype interface and increases the features that make it available for easy to usable.
b) Improving the entry process of SMS User Interface System.

c) Develop process of SMS User Interface System especially in security and privacy protocols and to really ascertain the delivery of the various messages to the recipients.

BIBLIOGRAPHY

BIBLIOGRAPHY

Abas, Z., Lim, T., & Woo, T. (2009). Mobile Learning Initiative through SMS: A Formative Evaluation. *ASEAN Journal of Open and Distance Learning*, *1*, 49-58.

Ajiboye, O., Tella, A., Adu, O., and Wojuola, I. (2007). Stakeholders' Perceptions of the Impact of GSM on Nigeria Rural Economy: Implication for an Emerging Communication Industry. *Journal of Mobile Communications*, 3, 1-7.

Alomari, Z. (2008). UUM Mail Notification System Using Mobile SMS Application.Master thesis, Malaysia:University Ultra Malaysia.

Astal, A. (2008). The Use of Simulation for Evaluating Branchless Banking Servicing Opportunities Via Cell :A Case Study on Palestine Islamic Bank. Master thesis , Palestine: Islamic University of Gaza.

Awodele, O., Adagunodo, E., Akinwale, A., Agbaje , M., & Idowu, S. (2009). An Improved SMS User Interface. *Interdisciplinary Journal of Information, Knowledge, and Management* , *4*, 51-62. . Retrieved August 10, 2010, from www.ijikm.org/Volume4/IJIKMv4p051-062Awodele425.pdf

BBC. (2002). *Hppy bthdy txt!* . Retrieved December 12, 2010, from http://news.bbc.co.uk/2/hi/uk_news/2538083.stm

Bertini, R. (2005). *Writing a literature reviw.* Portland: Portland State University website.

Begum, R. (2011). Prospect for Cell Phones as Instructional Tools in the EFL Classroom: A Case Study of Jahangirnagar University, Bangladesh. *English Language Teaching*, *4*, 105-115.

Brett, P. (2011). Students' experiences and engagement with SMS for learning in Higher Education. *Innovations in Education and Teaching International* , *48,* 137-147.

Calsoftlabs. (2007). *What is an SMSC?*. Retrieved August 1st , 2010, from http://www.calsoftlabs.com/whitepapers/sms-message.html.

Calsoftlabs. (2010). *SMS (Short Message Service)*. Retrieved August 20, 2010, from http://calsoftlabs.com/whitepapers/sms-message.html

Chang, Y., Hou, C. (2009). A STUDY ON CELLULAR CDMA-BASED FOR NEW GENERATION MOBILE RADIO SYSTEM. *Journal of Theoretical and Applied Information Technology*, 45-52.

Desi, S. (2008). *Check Orissa HSC Exam Results 2008 / Board of Secondary Education*. Orissa: The Council of Higher Secondary Education. Retrieved July 22, 2010, from http://moviedrive.blogspot.com/2008/06/check-orissa-hsc-exam-results-2008.html

Developershome. (2011). *Introduction to GSM / GPRS Wireless Modems*. Retrieved January 1, 2011, from http://www.developershome.com/sms/GSMModemIntro.asp

Developershome. (2011). *Introduction to SMS Messaging*. Retrieved January 1, 2011, from http://www.developershome.com/sms/smsIntro.asp

Eberspacher, J., Hans-Jorg, V., Bettstetter, C., & Hartmann, H. (2009). *GSM – Architecture,Protocols and Services.* Germany: A John Wiley and Sons, Ltd, Publication.

Faulkner, X., & Fintan, C. (2005). When fingers do the talking: A study of text messaging, *Interacting with Computers*, 17, 167-185.

Gleez. (2011). *Difference Between 1G, 2G, 2.5G, 3G, Pre-4G and 4G*. Retrieved July 05, 2010, from http://gleez.com/articles/did-you-know/difference-between-3g-4g.

ICT (2010). *The World in 2010 (The rise of 3G).* ITU World Telecommunication: ICT Indicators database.

Halse, A., & Wells, G. (2002). *A bi-directional SOAP / SMS gateway service*. South Africa: Rhodes University .Retrieved October 1, 2010, from http://www.eprints.ru.ac.za/99/02/HALSE-SATNAC-2002.pdf.

Harley, D., Winn, S., Pemberton, S., & Wilcox, P. (2007). Using texting to support students' transition to university. *Innovations in Education and Teaching International Journal*, *44*, 229-241.

Ibrahim, J. (2002). 4G Features .*Bechtel Telecommunications Technical Journal,1,* 11-14.

IUG. (2010). *About IUG.* Gaza: Islamic University of Gaza. Retrieved August 30, 2010, from http://www.iugaza.edu.ps/en/About/IntrducingIug.aspx

IUG. (2011). *IUG Facts and Numbers.* Gaza: Islamic University of Gaza Registeration Department.

Jayaraman, P., & Huggard, S. (2005). *Library SMS Services.* Malaysia: Monash University. Retrieved June 15, 2010, from http://www.infotech.monash.edu.au/promotion/coolcampus/ summer/summerpro04-05/libSMS.pdf

Kajumbula, R. (2006). *The effectiveness of mobile short messaging service (SMS) technologies in the support of selected distance education students of Makerere University, Uganda*. Uganda: Fourth Pan-Commonwealth Forum on Open Learning (PCF4).

Kasiulevicius, V., Sapoka, V., & Filipaviciute, R. (2006). Sample size calculation in epidemiological studies. *Gerontologija, 7,* 225–23.1

Kapow. (2008). *Kapow! SMS Gateway Mobile Communication Solutions*. Retrieved May 20, 2011, from http://www.Kapow.co.uk

Leggatt, H. (2010*). ITU: 6.1 trillion SMS messages will be sent this year.* Retrieved January 5, 2011, from http://www.bizreport.com/2010/10/itu-61-trillion-sms-messages-will-be-sent-this-year.html

Lingo, K. (2005). *SMS to Get Your Exam Results.* Singapore: Nanyang Technological University (NTU). Retrieved December 1, 2010, from http://www2.ntu.edu.sg/itzone/ may2005/smsresult.html

Link, M. (2011). *Definition of GSM Network.* Retrieved May 1, 2011, from http://www.ehow.com/about_6567044_definition-gsm-network.html

Malick, M. (2003). *Mobile and Wireless Design Essentials* . 1st edition. Indiana: Wiley.

Mavrakis, D. (2004). *Integrate SMS in your enterprise !* MONACO Cedex: MONACO TELEMATIQUE MC-TEL. Retrieved December 9, from http://www.smsfax.com/pdf/SMS%20Whitepaper.pdf

Markett, C., Weber, S., Tangney, B., & Arnedillo, I. (2006). Using short message service to encourage interactivity in the classroom. *Computers and Education Conference*, *46*, 280-293.

Mobisolutions. (2007). *Pan-Baltic SMS Gateway.* Retrieved October 9, from http://www.Mobisolutions.com/en/gateway.php.

Motiwalla, L. (2007). Mobile learning: A framework and evaluation. *Computers & Education Conference*, *49,* 581-596.

Nonyongo, E., Mabusela , K., & Monene, V. (2005). *Effectivness of SMS Communication Between University and Students.* South Africa: Institute for Continuing Education, University of South Africa.

Nordic. (2007). *SMS Gateway.* Sweden: Nordic Messaging Technologies Retrieved August 1st , 2010, from http:// www.nordicmessaging.se/files/docs/smsug44.pdf.

Owen, C. (1997). Design Research: Buliding the Knowledge Base. *Journal of the Japanese Society for the Science of Design, 5,* 36-45.

Ozeki. (2008). *OZEKI NG SMS Gateway.*Hungary: Ozeki Informatics Ltd. Retrieved June 1st , 2010, from http://www.ozekisms.com

Pakistan Telecommunication Authority. (2010). *Study on SMS Traffic in Pakistan & Global Trends*. Pakistan : Pakistan Telecommunication Authority. Retrieved MAy 10, 2011, from http://www.pta.gov.pk/media/sms_traffic_trend_120111.pdf

Peersman, G., Cvetkovic, S., Smythe, C., Spear, H., & Griffiths, P. (1997). The Integration of SMS with Voice Based Technology. *Advances in Interactive Voice Technologies for Telecommunication Services,1,* 1-7. Retrieved August 15, 2010, from http://ieeexplore.ieee.org/iel3/5176/14012/ 00643776.pdf

Philip, L. (2006). *Mobile Banking in Kuwait and Customers' Perceptions Regarding Usage of Mobile Banking Services.* Master thesis, Nicosia: Cyprus.

Popoola, I., Megbowon, I., & Adeloye, V. (2009). Performance Evaluation and Improvement on Quality of Service of Global System for Mobile Communications in Nigeria. *Journal of Information Technology Impact*, 9, 91-106.

Power, M. (2004). *Everyone Here Speaks TXT: Deaf People Using SMS in Australia and the Rest of the World.* Queensland: Bond University.

Resource, S. (2006). *Statistics: Use of text messaging (SMS) grows in the United States.* United States. Retrieved December 15, 2010, from http://www.resourceshelf.com/2006/09/01/statistics-use-of-text-messaging-smsgrows-in-the-united-states/

Rotimi, E., Awodele, O., & Bamidele, O. (2007). SMS Banking Services: A 21st Century Innovation in Banking Technology. *Informing Science and Information Technology*, *4,* 227-234.

Sachpazidis, I., Fragou, S., &Sakas, G. (2004). Medication Adherence System Using SMS Technology. *Intelligent Sensors, Sensor Networks and Information Processing Conference , 571* –575. Retrieved December 20, 2010, from http://ieeexplore.ieee. org/iel5/9710/30674/01417524.pdf

Sakkijha, H. (2010). *STRATEGIC RESEARCH SERVICE.* Amman, Jordan: Arab Advisors Group.

Sang, K., Bin Ramli, R., Prakash, V., &Bin Syed Mohamed, R. (2003). SMS GATEWWAY INTERFACE - REMOTE MONITORING AND CONTROLLING VIA GSM SMS. *4th National Conference*, 1, 84-87. Retrieved March 10, 2011, from http://www.ieeexpplore.ieee.org/iel5/8458/26640/01188308.pdf

Siemens, A. (2001). *AT command set for S45 Siemens mobile phones and modems.* Siemens AG. Retrieved June 20, 2010, from http://utenti.lycos.it/m50/sw/Command_set.pdf

Tiwari, R., & Buse, S. (2011). *The Mobile Commerce Prospects:A Strategic Analysis of Opportunities in the Banking Sector.* Hamburg: Hamburg University Press.

Traxler, J., & Riordan, B. (2003). Evaluating The Effectiveness of Retention strategies Using SMS, WAP and WWW Student Support . 4*th Annual LTSN-ICS Confference (54-58)* **.** Galway: National University of Ireland.

Tsirulnik, G. (2010). *More than 7 trillion SMS messages will be sent in 2011: ABI Research.* Retrieved April 28, 2011, from http://www.mobilemarketer.com/cms/news/research/8631.html

Uday Bhaskar, N., & Govindarajulu, P. (2008). Implications of mobile technology usage on learners in a learning process. *International Journal of Computer Science and Network Security, 8,* 251-259.

Visualtron. (2008). *What is SMS Gateway.* Retrieved February 24, 2011, from http://www.visualgsm.com: http://www.visualgsm.com/index.htm

Wataniya. (2010). *About Us*. Retrieved June 30, 2010, from http://e-career.wataniya.ps/qtelgroup/Page.aspx?BusinessUnitID=680

Wood, L. (2011). *Research and Markets: Worldwide Telecoms 2011 Key Statistics for a Changing Sector - While the Economic Downturn Persists Growth in Many Sectors of the Vast Industry Continues* . Retrieved July 25, 2011, from http://www.businesswire.com/news/home/20110727006151/en/Research-Markets-Worldwide-Telecoms-2011-Key-Statistics

Yamane, T. (1967). *Statistics, An Introductory Analysis*. New York: 2nd edition, Harper and Row.

Zhang, H., Song, W., & Burston, J. (2011). REEXAMINING THE EFFECTIVENESS OF VOCABULARY LEARNING VIA MOBILE PHONES. *The Turkish Online Journal of Educational Technology*, *10,* 203-214.

Zerfos, P., Meng, X., Wong, S., Samanta, V., & Lu, S. (2006). A Study of the Short Message Service of a Nationwide Cellular Network. *IMC '06 Proceedings of the 6th ACM SIGCOMM Conference on Internet measuremen , 4 ,* 263–268.

APPENDIX

A

Names of Questionnaire Arbitrators

No.	Name	University
1	Prof. Dr. Majed El Fara	Islamic University of Gaza
2	Prof. Dr. Maher Dourgham	Islamic University of Gaza
3	Dr. Mohammad Hussien	Islamic University of Gaza
4	Dr. Sami Abu Roos	Islamic University of Gaza
5	Dr. Bassam Abu Ghara	Al-Quds Open University

Questionnaire for An Improved SMS User Interface to Support University Services "Case Study On Islamic University Of Gaza (IUG)"

This study presents a development of education services based on Short Message Service (SMS). The university as educational organization has a lot of valuable information which can be provided to the students, such as grade release, enrollment services and university announcement. An Improved SMS User Interface System allows students to interact with all university services through their cellular phones.

As an example of the operation of this SMS User Interface System, the mode of operation is illustrated using a particular 3rd year student by the name **"Mohammad"** with roll number **"120080555"** and his password is **"11111111"**. Mohammad wants to know his GPA so he sends SMS message with Roll number, Password and Keyword **(120080555 11111111 GPA)** the system checks for Roll number and password request for result and compare to the student database. If the Roll number and password are incorrect the message **(Make sure your Username and Password are correct, Thank you)** will be sent to Mohammad else the server will check Mohammad balance. If there are enough points, server will check the answer based on Mohammad request Then the answer **(120080555 GPA=85 %)** will be sent to Mohammad and the his balance will be deducted else the message **(Please charge your account, Thank you)**.

Introduction:
This questionnaire consists of three sections

a. Respondent profile.
b. An Improved SMS User Interface System Evaluation .
c. Benefits and students satisfaction for SMS User Interface System.

Objective:

Obtain your evaluation on the SMS User Interface System.

Please answer all questions in section A, B and C.

The information that you give in this survey is only for research purpose and will be kept confidential. Your cooperation and participation is important in gathering the data necessary for this research.

Thank you very much for your time cooperation.

Sincerely
Mohammad I. Alsheikh Eid

Master of Business Administration

Faculty of Commerce

Islamic University of Gaza

Section A:

Respondent profile (Please v where appropriate) , Please answer the following questions:

(1) GENDER

a. Male ( )

b. Female ( )

(2) AGE

a. 18-25 ( )

b. Above 26 years ( )

(3) RESIDENCE

Please (v) the place of your residence.

a. Gaza North Province ( )

b. Gaza Province ( )

c. Gaza Middle Province ( )

d. Khan Youns Province ( )

e. Rafah Province ( )

(4) EDUCATIONAL BACKGROUND

Please (v) the highest level of your education.

a. First-Year Undergrad ( )

b. Second-Year Undergrad ( )

c. Third-Year Undergrad ( )

d. Fourth-Year Undergraduate ( )

e. Fifth-year Undergraduate ( )

f. First-Year Master's Student ( )

g. Second-Year Master's Student ( )

h. Other (Specify ……)

(5) COLLEGE

a. Please write name of your College (…….……)

(6) MOBILE PHONE

i. Do you have a mobile phone?

a. ☐ Yes

b. ☐ No

ii. Please write the model of your Phone (……)

iii. Latest facilities which you are aware of :

a. ☐ SMS

b. ☐ MMS

c. ☐ GPRS

d. ☐ Email

e. ☐ Other (Specify ……)

iv. What is your average monthly SMS utilization?

a. ☐ 0-9

b. ☐ 10-19

c. ☐ 20-29

d. ☐ 30 and above

v. Do you think SMS will be useful in education?

a. ☐ Yes

b. ☐ No

(7) INTERNET USAGE

i. Do you own a computer (Desktop or Laptop) with an internet connection?

a. ☐ Yes

b. ☐ No

ii. Frequency of Internet usage to enter IUG web page www.portal.iugaza.edu.ps :

a. Daily ( )

b. Weekly ( )

c. Monthly ( )

d. Rarely ( )

Section B:

This research contains fifteen questions for SMS User Interface System Evaluation.
Please circle the appropriate number which indicates the extent to which you are Agree or disagree with the statements using the following semantics differential scale.

Strongly Disagree ➔➔➔➔➔➔➔➔➔➔➔➔➔➔ **Strongly Agree**

1 ➔➔➔➔➔➔➔➔➔➔➔➔➔➔ **10**

	Statements	**Strongly Disagree ➔➔➔ Strongly Agree**									
(1)	SMS User Interface System is appropriate with IUG strategic vision.	1	2	3	4	5	6	7	8	9	10
(2)	I would find that using SMS User Interface System is a good modern idea.	1	2	3	4	5	6	7	8	9	10
(3)	I would find that using SMS User Interface System for registration is more effective	1	2	3	4	5	6	7	8	9	10
(4)	It would find it simple to use SMS User Interface System.	1	2	3	4	5	6	7	8	9	10
(5)	I would find the registry service through SMS User Interface System assists and complements the registry service on the internet.										
(6)	I would find it easy to use SMS User Interface System to get what I want.	1	2	3	4	5	6	7	8	9	10
(7)	My feeling will be comfortable using SMS User Interface System.	1	2	3	4	5	6	7	8	9	10
(8)	I like using SMS User Interface System.	1	2	3	4	5	6	7	8	9	10
(9)	It will be easy to learn SMS User Interface System error messages that clearly tell me how to fix problems.	1	2	3	4	5	6	7	8	9	10

(10)	The information provided by SMS User Interface System will be easy to understand.	1	2	3	4	5	6	7	8	9	10
(11)	SMS User Interface system will help me to communicate with all university services at any place	1	2	3	4	5	6	7	8	9	10
(12)	I would find that SMS User Interface System is considering as user friendly than using internet.	1	2	3	4	5	6	7	8	9	10
(13)	The organization of information on the SMS User Interface System will be clear .	1	2	3	4	5	6	7	8	9	10
(14)	I would find that SMS User Interface System would lead to rapidly obtain the required information.	1	2	3	4	5	6	7	8	9	10
(15)	Overall, I will be satisfied with this SMS User Interface System.	1	2	3	4	5	6	7	8	9	10

Section C:

This section contains of five questions to assess benefits and Student Satisfaction for An Improved SMS User Interface system**.** Please circle the appropriate number which indicates the extent to which you are Agree or disagree with the statements using the following semantics differential scale.

Strongly Disagree ➔➔➔➔➔➔➔➔➔➔➔➔➔ **Strongly Agree**

1 ➔➔➔➔➔➔➔➔➔➔➔➔➔ **10**

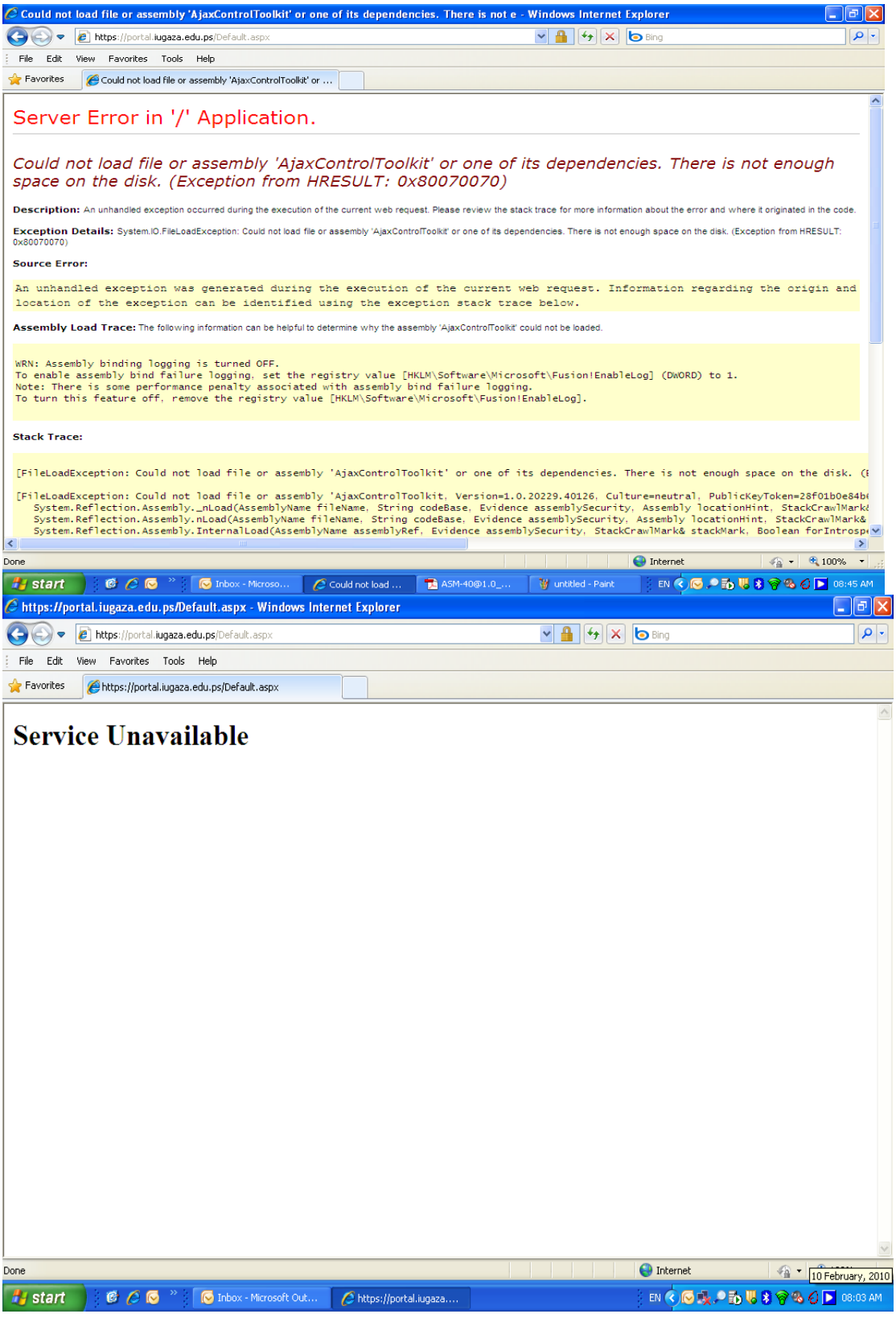
	Statements	**Strongly Disagree ➔➔➔ Strongly Agree**									
(1)	Using SMS User Interface System will save my time.	1	2	3	4	5	6	7	8	9	10
(2)	Using SMS User Interface System will save my efforts.	1	2	3	4	5	6	7	8	9	10
(3)	Using the current technology with SMS User Interface System will enhance my knowledge.	1	2	3	4	5	6	7	8	9	10
(4)	Using this SMS User Interface System would be very effective in registry services.	1	2	3	4	5	6	7	8	9	10
(5)	Using this SMS User Interface System will be a new way to communicate with students.	1	2	3	4	5	6	7	8	9	10

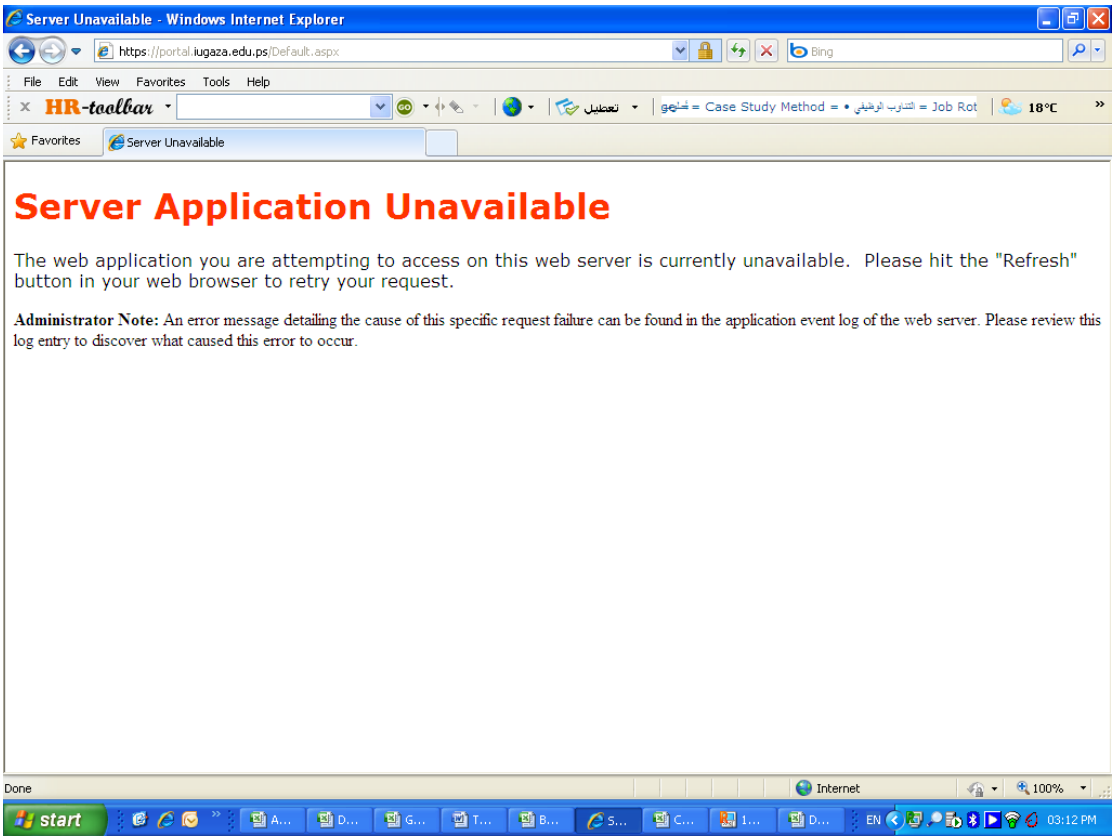
Are there any other comments you would like to suggest to improve SMS User Interface System?

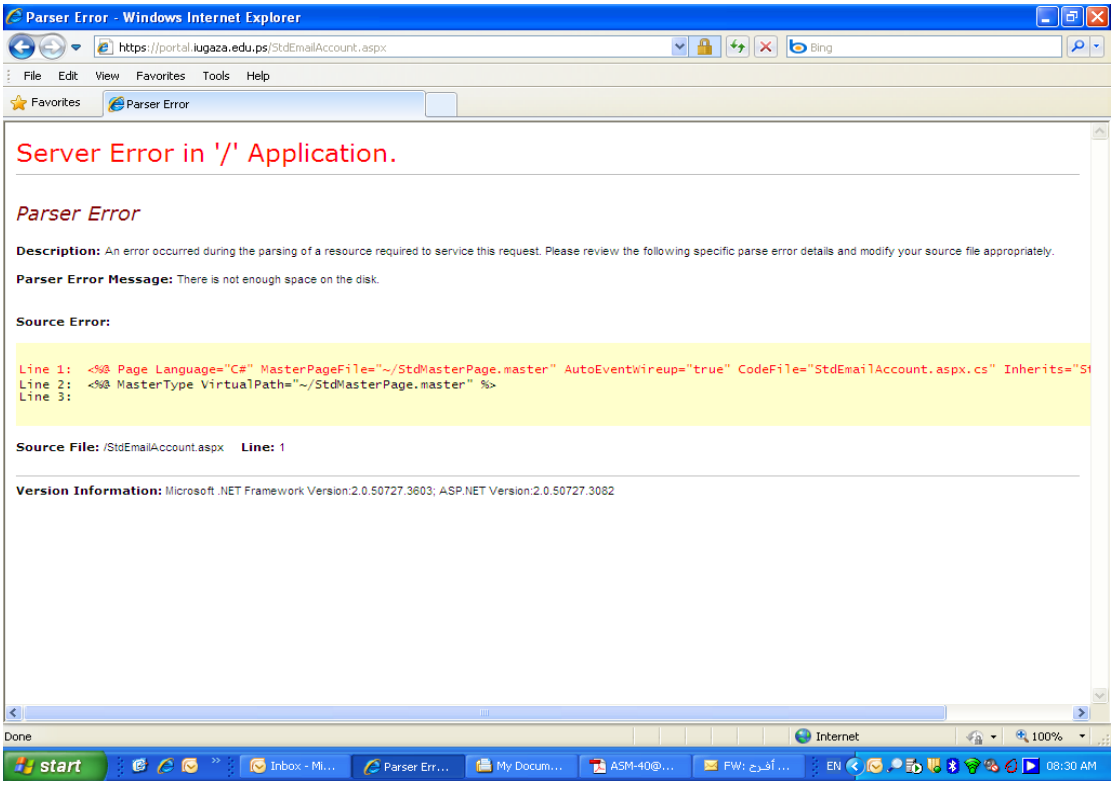
……
……
……
……

APPENDIX

B


Could not load file or assembly 'AjaxControlToolkit' or one of its dependencies. There is not e - Windows Internet Explorer
https://portal.iugaza.edu.ps/Default.aspx
File Edit View Favorites Tools Help
Server Error in '/' Application.
Could not load file or assembly 'AjaxControlToolkit' or one of its dependencies. There is not enough space on the disk. (Exception from HRESULT: 0x80070070)
Description: An unhandled exception occurred during the execution of the current web request. Please review the stack trace for more information about the error and where it originated in the code.
Exception Details: System.IO.FileLoadException: Could not load file or assembly 'AjaxControlToolkit' or one of its dependencies. There is not enough space on the disk. (Exception from HRESULT: 0x80070070)
Source Error:
An unhandled exception was generated during the execution of the current web request. Information regarding the origin and location of the exception can be identified using the exception stack trace below.
Assembly Load Trace: The following information can be helpful to determine why the assembly 'AjaxControlToolkit' could not be loaded.
WRN: Assembly binding logging is turned OFF.
To enable assembly bind failure logging, set the registry value [HKLM\Software\Microsoft\Fusion!EnableLog] (DWORD) to 1.
Note: There is some performance penalty associated with assembly bind failure logging.
To turn this feature off, remove the registry value [HKLM\Software\Microsoft\Fusion!EnableLog].
Stack Trace:
[FileLoadException: Could not load file or assembly 'AjaxControlToolkit' or one of its dependencies. There is not enough space on the disk.
[FileLoadException: Could not load file or assembly 'AjaxControlToolkit, Version=1.0.20229.40126, Culture=neutral, PublicKeyToken=28f01b0e84b
System.Reflection.Assembly._nLoad(AssemblyName fileName, String codeBase, Evidence assemblySecurity, Assembly locationHint, StackCrawlMark
System.Reflection.Assembly.nLoad(AssemblyName fileName, String codeBase, Evidence assemblySecurity, Assembly locationHint, StackCrawlMark&
System.Reflection.Assembly.InternalLoad(AssemblyName assemblyRef, Evidence assemblySecurity, StackCrawlMark& stackMark, Boolean forIntrosp
Done
Internet
100%
start
Inbox - Microso...
Could not load ...
ASM-40@1.0_...
untitled - Paint
EN
08:45 AM
https://portal.iugaza.edu.ps/Default.aspx - Windows Internet Explorer
https://portal.iugaza.edu.ps/Default.aspx
File Edit View Favorites Tools Help
Service Unavailable
Done
Internet
start
Inbox - Microsoft Out...
https://portal.iugaza....
EN
10 February, 2010
08:03 AM


Server Unavailable - Windows Internet Explorer
https://portal.iugaza.edu.ps/Default.aspx
File Edit View Favorites Tools Help
Favorites
Server Unavailable
Server Application Unavailable
The web application you are attempting to access on this web server is currently unavailable. Please hit the "Refresh" button in your web browser to retry your request.
Administrator Note: An error message detailing the cause of this specific request failure can be found in the application event log of the web server. Please review this log entry to discover what caused this error to occur.
Done
Internet
100%
start
03:12 PM


Parser Error - Windows Internet Explorer
https://portal.iugaza.edu.ps/StdEmailAccount.aspx
File Edit View Favorites Tools Help
Favorites
Parser Error
Server Error in '/' Application.
Parser Error
Description: An error occurred during the parsing of a resource required to service this request. Please review the following specific parse error details and modify your source file appropriately.
Parser Error Message: There is not enough space on the disk.
Source Error:
Line 1: <%@ Page Language="C#" MasterPageFile="~/StdMasterPage.master" AutoEventWireup="true" CodeFile="StdEmailAccount.aspx.cs" Inherits="St
Line 2: <%@ MasterType VirtualPath="~/StdMasterPage.master" %>
Line 3:
Source File: /StdEmailAccount.aspx Line: 1
Version Information: Microsoft .NET Framework Version:2.0.50727.3603; ASP.NET Version:2.0.50727.3082
Done
Internet
100%
start
08:30 AM