THE USE OF CELLULAR TECHNOLOGIES

BY STUDENTS AT THE UNIVERSITY OF ZULULAND

by

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ACKNOWLEDGMENTS

DECLARATION

I, the undersigned, hereby declare that the work contained in this study is my own original work and that I have not previously, in its entirety or in part, submitted it at any university for a degree.

Signature   :

Date   : 22 September 2003

ABSTRACT

This study begins by investigating the development of cellular technology as within the overall convergence of Information and Communication Technologies (ICT's).

The study briefly sketches its scope and extent in South Africa and the African continent. It examines the various communication functions of cellular technology and investigates the uses to which these functions are put, and examines the concept of praxis in this connection.

As a case study, it examines the use of cellular phones by students at the main campus of the University of Zululand. A survey is carried out and comparisons to international and national trends of cellular phone usage are referred to, and students' attitudes towards its use by lecturers and administration are probed.

In conclusion, recommendations are made concerning the use of cellular phones for communication purposes and for further research.

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CHAPTER ONE

1. THE PROBLEM AND ITS SETTING

1.1 INTRODUCTION

South Africa is one of the 'most connected' countries on the African continent and is the leading adopter of new cellular technologies, having 81% of the continent's cellular subscribers (Mersham: 1999:211). Furthermore, the convergence of Internet technologies with cellular technologies is proceeding at a rapid pace (Mersham: 2001), so that the mobile device (cellular phone) is now capable of carrying computing functions that used to be restricted to a desk top or lap top computer, electronic commerce transactions, e-mail, web browsing and many other functions. The focus is shifting from individual web sites or devices connected to the Internet, to constellations of hand held computers, devices and services that work together to deliver broader, integrated solutions to people's communications needs. People are increasingly demanding greater control over how, when and what information is delivered to them (Hill: 2000).

Since the young are nearly always the 'first adopters' of technology, there is a natural symbiosis of cellular technologies and the youth segment. As Mersham (2001:218) points out, the Short Message Service (SMS) offered by cellular providers has become an integral part of the lifestyle of young South Africans. Statistics show that for the average South African business, over 50% of monthly telephone costs can be attributed to calls made to cellular phones (Webber: 2003).

It is obvious then, that Universities need to be aware of, and adapt to, the changing patterns of communication that new digital communications bring about, particularly with regard to one of their major stakeholder groups, their students. There are several implications that arise from this issue. These include the nature and scope of internal communications between fellow students; between students and teaching staff; between students and various elements of the University administration and between students and their families (particularly at a residential University such as the University of Zululand).

It should be stated at this point that the researcher is employed by the University in its Centre for Guidance and Counselling as an assistant

recruitment officer. The researcher could not help but note that cellular phone use is very common among the student population.

1.2   THE PROBLEM

The first 'trigger' then, for developing this research, arose from the simple observation of the phenomenon usage of cellular technology among students at the University of Zululand. The researcher then posed the question as to whether there might be some value to the University in investigating actual usage patterns. This question was placed before the University's top management in a meeting. The Rector, Prof Hugh Africa, confirmed that the findings would be of great interest to the management as they may provide insights into opportunities for improving communications between staff and students on campus (Africa: 2002).

It was concluded that the central problem was to develop a method to measure cellular phone usage on the main campus and that clearly this would entail a survey of some description (Chapter 3). A further implication is that the researcher would need to investigate whether similar surveys had been conducted at other universities.

1.3 THE SUBPROBLEMS

This development triggered two more important considerations in the researcher's mind. The researcher realized that he should firstly address the need to understand, from a layman's perspective how the technology operates. What were the technical, social and economic implications of communications technologies? What are the broad trends that are emerging?

Secondly, it became clear that it would be necessary to categorize what the technology (and the handset devices it uses) can actually *do* from a communications point of view (referred to in this study as the functionality or functions of cellular technology).

According to du Toit (1996:30), the cellular telephone industry offers interesting research material as it has experienced a rapid growth cycle and is entering a new phase. It plays an important role in the development of the South African economy, as well as securing the country's place as having one of the technically most advanced cellular telephone industries worldwide.

In broad terms, these considerations then form the essential constituents of this inquiry.

1.4   THE METHODOLOGY

Firstly, from the above discussion, it will be necessary to conduct a literature survey on the subject of information and communication technologies in general and cellular technologies specifically.

It will also be necessary to employ a survey questionnaire to gauge student usage of cell phones on campus. A nonprobability convenience known group purposive sample will be employed. The terminology concerning this approach is detailed in section 3.4.

1.5   DEFINITION OF TERMS

Bluetooth is a wireless technology that allows intelligent, fast, cheap wireless communication between devices. Bluetooth to do away with messy cables by allowing devices such as mobile phones, PC's, printers and hand-held computers to communicate with one another without wires (Chow: 2002:18).

Electronic mail (e-mail) is the system which allows one to send messages from your computer to any other computer using the system, often merely by typing the recipient's name (Mersham and Skinner: 1999:196). It's the electronic transmission of messages, letters, and documents (http://www.infoplease.com/ce6/sci/A0817007.html).

Enhanced Message Service (EMS) offers the ability to send and receive a combination of simple melodies, pictures, sounds and standard text as an integrated message. It allows simple bitmap images to create animations, while sounds can be embedded into a normal SMS running on the current GSM network (Myers in Shapshak: 2002). Enhanced Message Service is an intermediate technology that's more evolutionary than revolutionary (Greengard: 2001:25).

General Packet Radio Service (GPRS) is a new nonvoice value added service that allows information to be sent and received across a mobile telephone network (www.gsmworld.com). It allows for outgoing information to be split into separate "packet", transmitted, and then seamlessly reassembled on the receiving side (Vodaworld magazine: 2002:17). In simple terms, GPRS allows cellular phone to connect with the Internet at an accelerated rate (Msomi: 2002:5).

All three of South Africa's cellular networks will offer wireless data services in the form of GPRS (general packet radio service) technology by the middle of 2003. Two already operate these mobile data service (Rotter: 2002:24). Both Vodacom and MTN have launched GPRS wireless data services to take advantage of new multimedia-capable handsets entering the market (da Silva: 2002:24).

Global System for Mobile communication (GSM) is a digital system, which allows mobile phones in one network to interconnect with other mobile networks. By inserting the SIM card into the GSM terminal, the user is able to receive calls at that terminal, make calls from that terminal, and receive other subscribed services (http://www.gsmworld.com).

Internet, an international 'network of networks' which transmits and receives all existing media forms, between on organisation and another, or between an individual and another, regardless of their geographical location (Mersham and Skinner: 2001:226).

Multimedia Message Service (MMS), provides the ability to send and receive video and still images combined with voice and text messages on a wireless device (Legard: 2002:14). It allows people to send and receive photos on their cellular handsets (Burns: 2002:24). The strength of MMS lies in its flexibility - you can convey whatever message you wish, to as many people as you like, as often as you like (Malan: 2002:15).

Personal Digital Assistant (PDA) is a small handheld device commonly used as a mobile computer or personal organizer. Many PDAs incorporate small keyboards, while others use touch screens with handwriting recognition. Some of these devices have Internet capabilities, either through a built-in or add-on modem (http://mobile.yahoo.com).

Short Message Service (SMS) is the short message that a person sends from one cellular phone to another or from a PC to a cellular phone. The service normally takes 160 characters long including punctuation and spaces (Lawson: 2001). For a full discussion see 2.6.3

Subscriber Identity Module (SIM) card is a smart card installed in every GSM handset, which connects a cellular phone to the network.

The SIM card provides personal mobility, so that the user can have access to subscribed services irrespective of a specific terminal (Scourias: 2002).

Third Generation (3G) technology provides a full set of services ranging from video streaming, video conferencing, easy and efficient Internet access, messaging and enhanced voice quality (Hurel: 2002). The 3G wireless-phone services include personal navigation and maps, streaming TV video, e-mail messaging, including large attachments, global roaming, which is the ability to use a single phone worldwide, and mobile commerce, including the use of phones to access bank accounts and make purchases (http://www.timesdispatch.com/2W61418481494.html: 2003).

Wireless Application Protocol (WAP) is the global standard for information transfer between mobile devices and the Internet. It's a standard that's continually evolving (Vodaworld magazine: 2002:29).

World Wide Web (WWW or W3), collection of globally distributed text and multimedia documents and files and other network services linked in such a way as to create an immense electronic library from which information can be retrieved quickly by intuitive searches (http://www.infoplease.com/ce6/sci/A0852745.html).

CHAPTER TWO

2. CELLULAR COMMUNICATION AS AN INFORMATION COMMUNICATION TECHNOLOGY

2.1 INTRODUCTION

The basic intention of this chapter is to contextualise cellular technology within the broader topic of information communication technologies (ICT) and to investigate the communication functionalities of cellular technologies.

2.2 INFORMATION TECHNOLOGIES

Information Technology (IT) can be defined as the interaction between artifacts (hardware, software and networks) and the practices or possibilities --praxis- to be realized through these artifacts. Information Technology users choose what features of the technology they will use, and how they will use those features (Flores, et al: 1988:36). The term *Information Technology* was first used by Leavitt and Whisler (1958:55) to emphasize the role of computers to support decision making and organisational information processing.

This term integrates not only the data processing capabilities of the computer, but also the human and managerial abilities involved in their use. As in any other technology, IT involves not only computers, but also the design of new practices and possibilities for new realms of practice (Flores et al: 1988:39).

However, Information Technology is different because of its inherent capacity to *informate* the processes in which it is used, by generating underlying information. IT not only enhanced automation by allowing some organisational processes to be performed with more predictability and reliability, but also generates a wealth of information about these automated processes. The capacity to automate and informate at the same time is what separates IT from any other technology that exists within organisations (Zuboff: 1998:125). IT and its applications in the world of technology have changed dramatically in the last decades. IT has evolved from a strictly supporting role in the back-office to a competitive weapon in the marketplace (Ives and Learmonth: 1984) and a new channel for conducting business (El Sawy and Bowles: 1997). The combination of increasing capabilities to process information and the decreasing costs of this technology has resulted in a broader range of computer applications today (Kambil: 1997:57).

2.3 COMMUNICATION TECHNOLOGIES

The study of communication is of particular interest today because of rapid development in new technologies for producing and transmitting and receiving information (Steinberg: 1995:1). The rise of communication technologies such as the fax, teleconferencing, and audio-conferencing brought people closer together to communicate despite long distances in earlier times (Barge et al: 2001:20). Now, we live in a world of cordless phones, electronic mail (e-mail), mobile cellular telephone, cable TV, satellite TV, national and international communications via fiber optic cables and satellites, personal computers (PC), data communications networks, and intelligent telecommunication systems. In the information age news, weather, sport, financial, shopping, business inventory, and other information sources are made available to us almost instantly via modern digital network (Couch II: 1995:1). Cellular phones permit us to communicate in a most direct manner, from individual to individual regardless of geographical location. (Hyden et al: 1994:77).

In whatever social situation we find ourselves – whether with the family or with friends, at work or at play, shopping, driving a car – the elemental social process is communication (Vickery and Vickery: 1987:16).

Whether for business or pleasure, people are expressing a growing need to keep in touch, informed and connected to the world around them (Lowe: 1995:19). From the business point of view, cellular phone technology allows a company access to stock levels from remote locations, to place stock orders or act as a direct marketing tool advising clients of special offers (Parak: 2002:4). Communication refers to the act, by one or more persons, of sending and receiving messages that are distorted by noise, occur within a context, have some effect, and provide some opportunity for feedback (Lowe: 1995:19). It can also be seen as a means of perpetuating and transferring values and culture to different parts of society or networks (Fill: 2002:8-9).

Today, researchers use new communication technologies to gather information. For example, a researcher can send a questionnaire through e-mail and receive responses through e-mail or through short message service of a respondents cellular phone (Lawson: 2001:249).

Communication technologies are widening the possibilities of networks through inter-networking – that is through the interconnection of networks which were often previously discrete satellite, wireless device

and cable networks (Ferguson: 1986:142). These technologies are designed to carry out the coding and exchange of data in digital format (Williams and Hartley: 1990:4).

A cellular phone is in fact a computer, which uses the network to transmit information to another phone (www.infoplease.com: 2001). Both cellular phones and computers have begun to merge into one another leaving no difference between them, "hence the technologies of computers and electronic communications are still developing" (Henderson and MacNaughton: 1980:4). According to, cellular phone manufacturers now offer telephones that contain screen displays and microprocessors. Such phones allow you to use new phone-based services such as banking by phone, home shopping services, e-mail delivery, caller ID and browsing the Internet – in fact they have become the means of mobile data transmission (Mersham and Skinner 2000:157).

There are many other communication devices which combine both telephone and computer functions. The two technologies are combined in a wireless pocket sized device that you can carry with you everywhere, for example, a laptop connected to the Internet and a PDA (Personal

Digital Assistant) are examples of portable personal communication devices.

Personal communication devices allow you to send and receive faxes, make and receive phone calls, create documents, browse the internet and communicate with your desktop every where you may be at any time (Mersham and Skinner: 2000:158). Today, recent advances in communication technologies, in particular the Internet and the World Wide Web, have opened up new possibilities for organisations to influence their environments by linking them directly with the final consumer of their products or services (Benbunana-Fich: 2002:7-8).

Gordon (2001: 19) argues that "advanced telecommunication services - most notably, cellular phone and Internet - will bring enormous changes to South Africa this decade" and there "are clear signs that with increasing competition, telecommunication development will accelerate fast". One now turns one's attention to cellular technology per se.

2.4 NEW INFORMATION TECHNOLOGIES AND CONVERGENCE

New information technology is new technology applied to the creation, storage, selection, transformation and distribution of information of many kinds.

It would be a mistake to think that the boundary between old and new information technology is perfectly sharp, but one can certainly discern distinct differences. First, 'new' information technologies are very much more focused on communication than their predecessors. For example, computers and computing have always been described as constituting an information technology, and allowed users to process data, but only relatively recently have computers been used extensively to share and transmit information. It is also only fairly recently that information technology has been used to facilitate communication between individuals wherever they may be geographically, particularly through the development of widespread, interlocking communication networks.

Second, we may distinguish new information technology as characterized by the convergence of older, once distinct technologies: computing, microelectronics and telecommunications (Hawkridge: 1983: 6-7) into a

singular, all embracing digital form. Voice telephony, fax and video, for example, were all considered to be 'separate' technologies only a few years ago. Information technology has brought with it an advantageous development in telecommunication systems by introducing new advanced devices and personal digital assistants (Chama: 2002:26).

According to Shapshak (2002:1), the main technology trend for the 21st century is the convergence of the two leading technologies, the Internet and the mobile market, bringing with it unprecedented information mobility and connectivity.

Third, new technologies are characterized by having a common digital platform. The new technologies such as cellular phone, cordless headsets, mobile PC's and computer networks are wireless devices connected to other devices without cables but in the form of network and digital (Mersham and Skinner: 2001:204). Digital technologies, then, are technologies that use electronics to transform information into a digital, binary format (Mersham and Skinner: 1999:191).

Traditionally, technology was defined as machinery and hardware (Scarbrough and Corbett: 1992:3). But most authors (e.g. Flores et al: 1988:19; Porter and Millar: 1985:33) seem to agree with Scott (1992:227) who proposes that "[Technology] includes not only the hardware used in performing work but also the skills and knowledge of the workers, and even the characteristics of the objects on the which work is performed". Technology is more than just machinery. It also encompasses the design of practices and possibilities to be realized through artifacts (Flores, et al: 1988:27).

According to Carbonell (1997:43), especially those who lack access to technology today often consider it a mysterious and fascinating phenomenon. Scarbrough and Corbett (1992:3) defined technology as the machinery and hardware. Other authors (Carbonell 1997:43 and Ohnsorge et al. 1994:212) agree that in the first decades of existence, technology was dominated by hardware. This is nowadays changing as we observe more and more a dominance of software. Flores et al (1988:27) advanced the argument by arguing that it is not only about hardware or software but also incorporates the artifacts design characteristics.

The latter is very important to the discussion because ease of use as experienced by the (non-technical) user determines ultimately the adoption patterns for any technology.

2.5   THE CONCEPT OF PRAXIS

Technology can be thought of a combination of a physical (or objective) component – the artifact – and an intangible (or subjective) component that refers to the possible uses of the artifact. Technology is a dynamic concept, based on the interplay between artifacts and praxis. Technologies are potential praxis because artifacts are designed to produce specific practices. But praxis are emergent. Therefore, each individual, group or organisation may use or appropriate the technology in a different way (Benbunan-Fich: 2002:2). This is a defining characteristic on new technologies. Users decide on how they will use the technology rather than designers, producers and policy makers.

Appropriation is the process whereby a user selects and gives meaning to features of the technology. It is the mode or fashion in which a structure is used, adapted and reproduced. Users do not passively receive the technology in a preexisting form; rather, they actively adapt the technology to their own ends.

The use of SMS is a good example of how users have appropriated a particular a subset of cellular technology which has become a global phenomenon. Therefore, a technology in use should be conceived as a set of social practices that emerge and evolve over time (Giddens: 1979:31; Poole and DeSanctis: 1990:66). Appropriation processes occur because the interaction between artifacts and practices is not completely determined (Benbunan-Fich: 2002:3).

In essence the new technologies have given rise to communication technologies, that are referred to as 'wireless communications'. These offer speed, ease of use and range and coverage beyond those obtainable by other kinds of communications.

What is clear is that the development of communication technologies and communicative structures is intimately related to the new information technology. As Gerbner *et al* put it, there is a clear need for substantive analysis and synthesis of change in terms of concomitant communications developments (Gebner et al 1973:7-100).

2.6   CELLULAR TECHNOLOGY

In the past a telephone was the restricted device for communicating sound, especially speech, usually by means of wires in an electric circuit. When one talks on the telephone, the human voice causes sounds to be formed into words, these sounds are encoded and transmitted in electronic wave patterns. These wave patterns are transmitted over a channel to their destination where they are converted back into sound waves received by the human ear (A Reader for the Professional Librarian: 1982:129).

The telephone lines used include the ordinary open wire lines, lead-sheathed cables consisting of many lines, and coaxial and fiber-optic cables. Transmission of telephone messages over long distances is often accomplished by means of radio and microwave transmissions (www.infoplease.com: 2001). A telephone is seen to be best at point-to-point communication requiring only limited fidelity but sophisticated switching (Lorimer: 1994:141).

New communication networks merge the capabilities of the telephone network and of computer networks, enabling the simultaneous transmission of voice and data.

This merging makes new applications possible, such as voice mail, in which a voice message is stored on the disk of the destination workstation which serves as an answering machine (Walrand: 1998:3).

Wireless systems based on cellular technologies are already the most popular method of addressing the needs of mobile users and even fixed users where the local infrastructure is poor. As a result many countries have a cellular telephone service (Jensen: 1996). Wireless networks in particular are seen as a cost-effective way to replace decaying fixed-line networks relatively cheaply and quickly (Boyd: 2002:24).

Telephone and cellular phone are functioning with the same purpose of processing messages, and the difference between the two is that cellular phone is a wireless communication technology and it is portable. Cellular communication has become the most efficient way to provide for Africa's telecommunication needs and is having a profound impact on the continent's growth and development (Manson: 2002). As Mersham & Skinner (2001:207) argue, lack of infrastructure (ie, wired networks) hampers the uptake of internet technologies, but cellular technologies, on the other hand, look likely "to be the major route to web access" for the African continent.

Cellular phone technology has already demonstrated tremendous progress in communications for South Africans who previously had little or no access to Telkom landline phone services. For example, students can communicate with their parents, relatives and friends using cellular phone at anytime, anywhere (within range of a transmitter tower).

2.6.1 CELLULAR PHONE DEVICES

The cellular phone is a type of wireless communication that is most familiar to mobile phones users.

Cellular phones can be thought of as mini computers as new technology allows an increasing array of tasks and functions to be performed on the sophisticated devices (Brennan and Gill: 2001:26). Many believe that the cellular phone is one of the technologies set to revolutionise mobile and internet technology (Gordon: 2002:18).

Cellular phones work through the Global System for Mobile communication (GSM) spectrum, a digital system which allows mobile phones in one network to interconnect with other mobile networks.

A cellular phone can be likened to a wireless radio but is a much more sophisticated device, which enable their users to place and receive telephone calls from a wireless terminal (www.infoplease.com: 2001).

The rapid growth in the use of cellular telephones took place in the 1990's (Walrand: 1998:6) and cellular phones have been one of the fastest growing industries in modern history.

Mobile electronic communications for people began with the introduction of personal paging systems in the 1970's - expanding into remote telephones and cellular phones by the end of the century. Most people today have either portable phones in the home, cellular phones for away-from-home use or both. These devices are connecting people in convenient ways as their cost continues to decline with expanded use. The cost of cellular phones will continue to drop as the market increases in size and technologies become more capable and increasingly cheaper to operate. Connection to the Internet and company Intranets has meant that there has developed a "remote world of the ethereal office space making us more connected and productive" (Begich and Roderick: 2003; Chiba 2002:31).

A cellular phone contains both a transmitter and a receiver, and can use both of them simultaneously. It can make use of hundreds of different frequencies and can automatically switch between frequencies. New telecommunication technologies to take note of in South Africa include the much-publicised GPRS (general packet radio service), 3G (third generation), MMS (multimedia message service) and EMS (enhanced message service) (Martinson: 2002).

A cellular phone works on a short-range wireless protocol meant to allow mobile devices to share information and applications without the worry of cables or interface incompatibilities. Cellular phone systems allow small, low-power portable transceivers access to the telephone network; and increasingly, to provide access to the Internet. When someone calls a cellular phone, it has special codes associated with it and these codes are used to identify the phone's owner and the service providers. A cellular phone is a duplex device, which means that you use one frequency for talking and a second separate frequency for listening.

2.6.2 CELLULAR PHONE FUNCTIONALITIES

Cellular phones have many capabilities that make them functional and desirable for users. The first three functions below are presently the main

functions in use on the South African networks, namely voice messaging, text messaging and picture messaging. Others, such as email sending and receiving, Internet browsing, electronic picture imaging are possible on some advanced phones.

However, they remain out of the reach of most users because of cost at the time of writing. The main functions are outlined below.

Voice messaging. When a caller dials a phone that is switched off or does not get the signal, the caller can leave a message for the recipient in the recipient's *voice mailbox.* The recipient has a choice: he or she may choose to activate the voice mailbox at the *voice message centre* or not through their service provider. When the person called switches his or her phone on, it will indicate that someone has called and left a message. The recipient can then dial the message centre and retrieve the massage.

The text message. The text message is referred to as the Short Message Service or more commonly an SMS. To send an SMS, one types the message from one's mobile phone or computer then dials the number of the recipient and sends it. The recipient's phone will indicate that there is a text message to be retrieved (www.exactmobile.co.za: 2001).

The picture message. A picture message is a simple computer created graphic that is sent from one cell phone to another. The user downloads the selected pre-designed graphic from the network to his or her phone before sending it. The picture messages at present do not have sounds but with the coming of 3G phones (third generation phones) they are expected to carry sounds (Yebonews: 2001).

The Short Messaging Service is summarized above. However, because this particular function has in many ways overtaken voice transmission in terms of popularity among users and in terms of traffic volume, this function is now discussed in more detail below.

2.6.3 SHORT MESSAGE SERVICE

Short Message Service (SMS) is the short message that a person sends from one cellular phone to another or from a PC to a cellular phone. The service normally takes 160 characters long including punctuation and spaces. SMS has been available for years on GSM (Global System for Mobile communications) phones and has become a prevalent form of communication.

Because messages are small, SMS can be an efficient way to get information across a circuit-switched network that was never intended for big downloads. It does not require a dedicated circuit that stays up throughout a conversation, so users are charged per message and avoid airtime charges (Lawson: 2001).

When someone sends the Short Message Service it travels via the network from the area in which the sender is in, to the Short Message Service Centre (SMSC). When the message is received by SMSC, the message is stored. At the same time the SMSC requests routing information for the recipient from the network and the network provides routing information for the recipient, telling the SMSC where the recipient is. The SMSC then sends the SMS in the direction where the recipient is, using the fastest route. If the recipient's phone is switched ON, the message is received directly to the phone. If the recipient's phone is switched OFF, the SMSC will save the message and deliver it when the recipient switches the phone ON (Parthab: 2001:30-31).
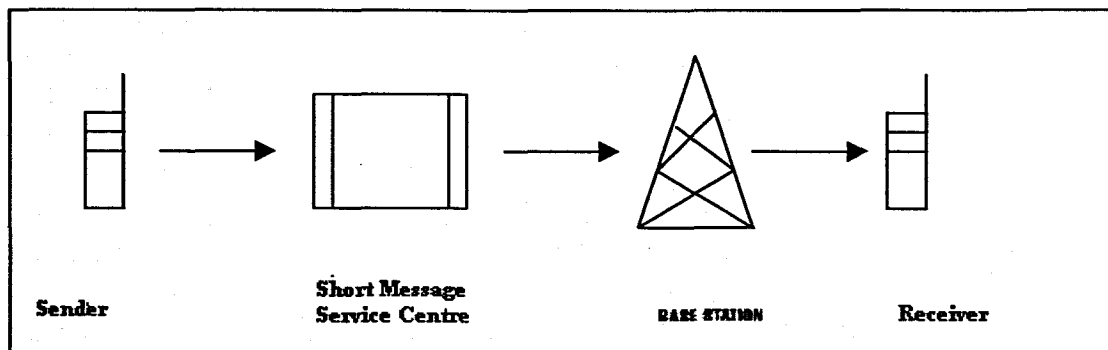
Figure. 3: H*ow a Short Message Service is sent from mobile to mobile.*

Common wisdom is that SMS is fast, simple and affordable (Oerlemans: 2001). SMS is growing at rapid pace since the time that the first SMS was sent in 1992. Almost everyone who uses cellular phone has made use of the SMS, either by receiving a voicemail notification, or by sending a text message, picture message, ringtone or an operator logo (Parthab: 2001:26-27). The virtue of SMS lies in its simplicity, ease of use and universality. It is also offers a more extensive variety of applications – weather updates, sports scores, news, ordering of tickets, advertisements, payment authorizations, banking transactions and more (Oerlemans: 2001).

Almost anything that stems from a source of information can be sent via a SMS (Parthab: 2001:30-31). The phenomenal success of this 'afterthought' to the cellular phone has "spawned a new language, fired

the imaginations of artists, musical composers, poets, and the youth (Hainebach: 2001).

To give an idea of the scope of SMS activity, total SMSs sent on Christmas day, New Year's day and Good Friday in South Africa, amounts to more than 9.5 million messages. Growth of SMS and general SMS statistics world wide "is expected to exceed 100 billion messages per month globally within the next 18 months (Vodaworld magazine: 2001/2002:7). Statistics world wide: Britain has more than 40 million cellular phone users and, according to statistics from the Mobile Data Association, nearly a billion text messages were sent in the UK. The UK figures rose from 322 million SMSs a year ago to 929 million SMSs this year. The Asian Pacific is also experiencing a rapid growth of SMS. This region is recorded as sending 3 billion messages per month. The growth of SMS is extraordinary across the world: Germany sends more than a billion SMSs per month, while France and Italy each send more than 500 million. At the other end of the world, Australia and New Zealand currently send a total of more than a 100 million SMSs (Parthab: 2001:26-27).

Instant messaging, or chat, as most people know it, is about to enter the mainstream of business and the world of mobile computing. It is worth looking at the killer difference between SMS and instant messaging. SMSs are effectively "store and forward" or "send and forget" technologies, whereas the genius of Internet-based instant messaging is that it has a "presence" feature which advises you whether the person at the other end is online or not (Fosbrook: 2001:29). SMS is seen as a good thing. It has turned out to be the killer application that the cellular phone industry pundits sought, not realising it was mushrooming in their own backyards. Its success has 'knocked their socks off', while phenomenal SMS traffic keeps cellular networks on a continual upgrade cycle as older equipment struggles under the load (Hainebach: 2001). The ability to have the best of both worlds is what is creating the enthusiasm among cellular providers. As always, with the sheer weight of candidate mobile units deployed in the field, the numbers are compelling. It is expected that the volume of corporate instant messaging users to soar from six million last year to 181 million in 2004 (Fosbrook: 2001:29)

Network operators and equipment manufacturers have identified mobile messaging as one of the strongest application areas in the mobile sector.

The mobile messaging has captured the imagination of mobile users and it is no longer a technology limited to the youth market, having gained broad appeal across all age groups. The report supports this view, predicting exponential growth in SMS traffic. In addition, it indicates that two new messaging standard, EMS (Enhanced Messaging Service) and MMS (Multimedia Messaging Service) will further enhance this trend as 2.5G (GPRS) and 3G networks come to market (Vicente: 2001:27).

According to Hainebach (2001), SMS has not only taken off for personal messages, but is widely gaining acceptance as a legitimate business tool which companies use to communicate with staff and customers. SMS is widely used as a marketing tool to launch new products and to alert customers to sales and special offers. These will become more dynamic as the new-technology phones make it feasible to send EMS and MMS to widespread target markets. Within the South African market cellular technology is a 'stepping stone' to the use of new technologies. Enhanced Message Service was the first step towards offering multimedia services on cellular phones, and which was likely to overtake the phenomenal popularity of SMS.

EMS enables graphics to be inserted into SMS text messages and for text to be formatted with bold or italics characters (Brennan and Gill: 2001).

On the other hand, while Wireless Application Protocol (WAP) is said to be superior from a capability perspective, the uptake of this technology has not been as expected. The use of applications based on SMS is growing at a rapid pace, but WAP-based services are showing a minor growth curve (Oerlemans: 2001).

2.6.4 CELLULAR PHONE NETWORKS

The term cellular technologies refer not only a cellular phone but also to the technical components that supports its services, such as the network. In essence a cellular network is a system in which a small or mobile radio transmitter and receiver is linked via microwave radio frequencies to base transmitter and receiver station that then connect the user to a conventional telephone network (www.infoplease.com: 2001).

There are three key components that make up most cellular radio systems. First there is the network, a carefully engineered system of radio transmitters with base station, and a mobile setup switches based at central control, which gathers traffic from dozens of cells and passes it on

the public switched telephone network. According to Landino (1999), a digital service provides the greatest clarity, but analog has a greater coverage area. Dual band service combines the best of both as it has the ability to switch between digital and analog as the caller travels across different regions.

To imagine the structure of a cellular radio network, one may visualise a honeycomb. It is made up of six-sided geometrical shapes (hexagons) arranged in neat rows. The hexagons are the cells and in the center of each cell is a radio transmitter that "broadcasts" in the frequency range set aside for cellular radio service. Cellular radio towers are connected to each other and with the rest of the public phone network through a mobile telephone switching office. When one turns on ones cellular phone it lets the nearest antenna know you are there. Then, when a call comes in for you, the system pages your cellular phone, it rings, and if you answer your cellular phone it negotiates with the nearest cell site to determine which channel to put you on. Similarly, when you place a call your cellular phone requests a channel for you and transmits the number you send.

Each cell may only consist of an area of a few kilometers, and in a speeding automobile you may cross a cell boundary every few minutes. When that happens, the cell you are leaving automatically "hands off" your call to the next cell, which assigns you a new channel so you can continue.

Digital cellular phones further increase the capacity of mobile phone systems by using digital compression to reduce the size of the channels that are required. They also take advantage of multiplexing to further expand capacity. Two basic approaches can be identified (Straubhaar & LaRose 2002:330). One approach assigns each caller to a designated time slot on a particular channel and then makes callers "take turns" transmitting brief streams of data on the same channel. The other approach scatters the digital fragments of your conversation over many channels, but attaches an identification code to each one so that they may be snatched from the air and reassembled into a phone conversation.

Mobiles phones use a network of base stations and antennas to cover a large area. The network transmits all information and calls from caller's cellular phone to the base station and from the base station to the requested cellular phone.

The area a base station covers is called a cell, the exact position where the base station and antennas are located is called a cell site. A cell site contains a radio transceiver and a base station which manages, sends and receives traffic from the mobiles in its geographical area to a cellular telephone switch (Pilgrim: 2001).

Each cell site's radio base station uses a computerized 800 or 900 megahertz transceiver with an antenna to provide coverage. Each base station uses carefully chosen frequencies to reduce interference with neighbouring cells. The directed sites cover tunnels, subways and specific roadways. The area served depends on topography, population and traffic. In some GSM systems, a base station exists with pico cells covering building interiors, microcells covering selected outdoor areas and macrocells providing more extensive coverage to wide areas (www.telecomwriting.com: 2001).

For a person to have a complete working cellular device, one must have a cellular phone (a small, handheld device) containing a SIM card (Subscriber Identity Module) which connects a cellular phone to the network. The switch in the mobile phone ('mobile switch') determines what cell will carry the call and assigns a vacant radio channel within that

cell to take the conversation. It selects the cell to serve you by measuring signals strength, matching your mobile to the cell that has picked up the strongest signal. Managing handoffs or handovers, that is moving from cell to cell, is handled in a similar manner by the network. The base station serving your call sends a hand-off request to the mobile switch after your signal drops below a handover threshold. The cell site makes several scans to confirm this and then switches your call to the next cell. You may drive fifty kilometres, use eight different cells and never realise that your call has been transferred (www.telecomwriting.com: 2001).

Figure 1 shows how the cellular mobile chooses the signal using the 'base station assignment' method:
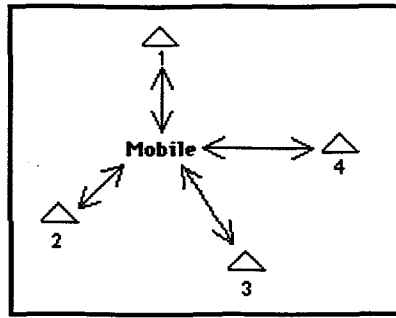
Figure 1: Base Station assignment

Upon turning on your phone the mobile switch gathers signal strength reports from the different cells and assigns your phone to the cell with the strongest reading. In this simplified example, 1 represents the strongest signal and 4 is the weakest. Although in many cases the cell site nearest you gets your call, it may not, depending on topography and other factors.

Source: *2001:www.telecomwriting.com*

2.7   GLOBAL CELLULAR PHONE OWNERSHIP

Patterns in western countries show a huge take up of cellular technology. For example, in the UK there are an estimated 24million mobile users, around 40% of the British population, including 4million schoolchildren. Virtually half of all 7-16-year-olds now have a mobile phone of their own, according to a survey published by National Opinion Poll (NOP). Mobile phone ownership is highest among 14-16-year-olds, 77% of

38

whom now have one. The survey also reaffirms the popularity of text messages among the young. The average 7-16-year-old mobile phone user sends 2.5 text messages a day, exceeding the typical two voice calls made each day. Once again, 14-16-year-olds lead the way, sending an average of just over three text messages a day (http://www.nop.co.uk/news/news/survey: 2001).

In Japan, 60% of teenagers have access to a cellular phone. Text messaging is very popular among the young and they send and average of 2.5 text messages a day, exceeding the typical two voice calls made each day. (http://news.bbc.co.uk/hi/english/uk/newsid%5f591000/591791.stm: 2000).

According to Williamson and MacLeod (2001), "kids, and especially those in their mid-teens, guard their privacy jealously. Privacy is something that often may not be available to them at school or in the home, so they view SMS texting as the ideal way in which to communicate confidentially with one another. Parents frequently give their child a mobile phone for use in emergencies or in the belief that it will help them keep tabs on their offspring.

Kids, though, have been quick to turn the mobile phone to their own advantage" (www.nop.co.uk/news/news%5fsurvey%5fhalf%5fof%5f7-16s.html).

The National Family and Parenting Institute discovered that "a growing number of children have access to mobile phones, and they are a great source of comfort and security for parents, knowing they can find out where their children are and can keep in touch with them". As we shall see in the University of Zululand survey, security figures strongly as a reason for cellular phone ownership.

2.8   CELLULAR TECHNOLOGIES IN AFRICA

Cellular phones have a special pride of place in Africa where teledensity still lags far behind the rest of the world, bringing undreamed-of voice connectivity to a continent deprived of telecommunications for decades. Despite the promises of the information super-highway and its endless access to data, it seems what people really want, and need, in Africa is a telephone. Shapshak (2002:33) reports that the number of cellular phone users in Africa in 2002 is estimated to be 30-million having grown from just 2-million in 1997.

The demand for new generation wireless telecommunications infrastructure in Africa is high, stemming from the low density of conventional wired telecommunications networks (Boyd: 2002:24). Figure 2 shows the GSM market penetration in Africa.

BIGGEST GSM MARKETS IN AFRICA

COUNTRY	SUBSCRIBERS	LAST ASSESSMENT	%
OTHERS	1. 900. 000	*JUNE* 2000	14
BOTSWANA	140. 000	*SEPTEMBER* 2000	1.5
EGYPT	1. 401. 000	*SEPTEMBER* 2000	14
GHANA	132. 000	*SEPTEMBER* 2000	1.5
MOROCCO	1. 530. 000	*SEPTEMBER* 2000	16
REUNION	197. 000	*SEPTEMBER* 2000	1.8
ZIMBABWE	256. 000	*SEPTEMBER* 2000	2
SOUTH AFRICA	9. 05	*JULY* 2001	47

Figure. 2: *African countries that are cellular phone network connected.*

Source: 2001: www.cellular.co.za

Africa has really embraced wireless telecommunications technology. A decade ago there was not a single cellular network on the continent. Presently a minority of countries are without one or several GSM networks (da Silva: 2002:24).

At the time of writing, there are more than 100 cellular networks in Africa with 80% as many cellular phone users as fixed- line users (Shapshak 2002:1). The International Telecommunications Union's (ITU) secretary general Yoshio Utsumi refers to the "reach of the Africa's new mobile networks which will be heard in the streets, in the shop, on the beach, in cars and in trains". Many research findings predict the growth of cellular phone users in few years to come. Cellular phone technology is predicted to have over 1.3-billion worldwide users by the year 2005 whereas the total mobile market in Africa is predicted to reach to 200-million in the same year. (Begich & Roderick: 2002:33; Shapshak: 2002:1). According to Tonelli's predictions, by 2010 there would be 65-million cellular users in Africa using 3G services (this technology provides a full set of services ranging from video streaming, video conferencing, easy and efficient Internet access, messaging and enhanced voice quality).

2.8.1 SOUTH AFRICAN SUBSCRIBERS AND STATISTICS

South Africa leads the African continent in terms of cellular technology adoption. For example, South Africa has only 5,7% of the total population of Africa and 81,4% of the total number of cellular subscribers (Mersham and Skinner: 1999:211). The South African market size as of July 2001 was an estimated 9,05 million cellular phone users. Analysts predict that the cellular phone market will reach saturation point at about 16 million (Msomi: 2001:6).

South African research house BMI-TechKnowledge predicts the growth of mobile markets at 35% and the demand will still be for voice communications 31%, followed closely by personalised infotainment services 30% and Internet access incorporating multimedia messaging 18% (Shapshak: 2002:2).

During the period of study (January -December 2001) there were two cellular service providers that dominated the market in South Africa, namely MTN and Vodacom. Both Vodacom and MTN were officially launched in June 1994 (www.cellular.co.za: 2001). By early 1996, approximately 465 000 subscribers had been signed up on both networks,

In February 2001, a third license was awarded to the Cell C Consortium which began offering services in December 2001. Cell C negotiated with Vodacom to create a virtual network operating over Vodacom infrastructure (Laham in Caroll: 2001:1). Vodacom and MTN operate at GSM 900 MHz range whereas Cell C operates at GSM 1800 MHz spectrum (Memela: 2002:3). Cell C ended its first year of operations with 1 million subscribers, well ahead of forecasts (da Silva: 2002:24).

Various forms of pragmatic cooperation have characterised the cellular provider market. As mentioned above, Cell C 'piggybacked' the Vodacom network infrastructure, and in the start up phase of industry, Vodacom was forced to share its "112" Emergency Services line with MTN to ensure that MTN subscribers could access emergency services on the national roads which were not yet covered by MTN (Business Day 1996:9).

2.9   SOCIAL FUNCTIONS OF CELLULAR TECHNOLOGY

In section 2.5.2, the various functions of cell phones were discussed. Among these are functions such as SMS, picture messaging, etc. However, it is import to recognise that there are social functions that can be described in terms of the way users interact with the technology.

As argued previously in section 2.5, users do not passively receive the technology in its pre-existing form; rather, they actively adapt the technology to their own ends. Therefore, a technology in use should be conceived as a set of social practices that emerge and evolve over time (Giddens: 1979:31; Poole and DeSanctis: 1990:66).

2.9.1 PERSONALISATION AND 'FASHION STATEMENTS'

Cellular phones and their accessories also have social functions. They have come to represent status and fashionability amongst many users. Fashion is one of the majors purchasing criteria when buying a cellular phone. For users, it is not just a question of to having the best phone from a technical and functional point of view. It must be able to be *personalised* and be adaptable to current fashions in terms of its casing cover, its ring tones, the pictorial elements in the display ('screensavers' and 'operator logos') and so on. This has important marketing implications (Vodaworld magazine: 2001:18).

The cellular phone cover with its sophisticated buttons has played a significant role in the field of advertising. Many companies have used cellular covers to advertise themselves because they know that people buy these covers to decorate their cellular phones.

Other personalised icons that are used for advertisement are the logos. *Operator logos* are the pictures saved in a cellular phone and it decorates the screen of the cellular phone (Yebonews: 2001). These logos, like some cell covers, are used by different companies like Coca-Cola, BMW, Nike and many others to advertise. However, many companies now offer services that allow users to select from thousands of different logos and download onto their phones to 'personalise' their phones.

Similarly *ringtones* have become important as a means to personalize ones phone. A ringtone is the particular sound or music that a cellular phone produces when it notifies a user that a call has been made to the phone. There are many kinds of ringtones. Apart from a variety that is available internally on the phone itself, many others may be downloaded from the Internet. They are often based on latest movies, television themes and popular music 'chart toppers' (Leps: 2002). There are huge varieties, however, and a classical music enthusiast, for example, can download themes from classical music.

2.9.2 ENTERTAINMENT

Cellular phones come with various 'gaming' features that can be played by employing the phone's keypad. Most handset manufacturers are now producing phones with colour screens and polyphonic sound. The latest GPRS handset has a colour screen, polyphonic sound and a number of PlayStation-type games Burns (2002:24).

Some games are pre-loaded on the phone's memory chip. Others can be downloaded from the Internet. Since most of these games generate music and sound effects (which can create social problems. See below in section 'social etiquette'). According to "most handset manufacturers are now producing phones with colour screens and polyphonic sound. The latest GPRS handset is coming with colour screen, polyphonic sound and whole lot of PlayStation-type games".

2.9.3 SOCIAL ETIQUETTE

The cellular phone's greatest advantage, its, mobility, also brings about one of its most negatively viewed consequences which may be loosely described as the invasion of the privacy of others.

The intrusive nature of a ringing cellular phone, and the subsequent dialogue that a user may engage in, whilst in a variety of public, private and work environments, has engendered much debate.

There are no firm rules in making and receiving calls, but it is considered impolite and disturbing to receive or make calls when people are for example being entertained while watching a movie at a cinema, attending a church service, reading in a library or attending a funeral. It is common, for example, that at the beginning of a business meeting that cellular phones are switched off. Some chairpersons make it a rule and formally request that cellular phones are switched off or switched to 'silent' for the duration of the meeting. There has always been a norm against bringing work to social settings. It is rude to annoy people who are trying to enjoy themselves without the various ringtones that cellular phones generate. Furthermore, many people are uncomfortable when they are 'forced' to overhear someone else's conversation. Nevertheless, one can suggest that these 'rules' and 'norms' tend to be consistently ignored by many users.

In the United States, restaurant owners are also considering curbs. They are seeking to curb the 42 percent of cellular phone owners who have made calls from lunch or dinner, according to the National Restaurant

Association. Many restaurant owners and their customers find the persistent ring of the cellular phone, and the often high-decibel conversation that follows, annoying (Segan: 2000).

2.9.4 IMPACT ON LEARNERS

In a growing number of schools are banning students cellular phone use because students switch-on their cellular phones in the classrooms during lessons (Segan: 2000). Communication technologies have brought about a wireless revolution at schools and tertiary institutions. Overseas school and university administrators have seen the necessity to ban cellular phones and pagers from many classrooms. This is often because students can use them to send test answers to each other. In a particular example, a student who used his cellular phone to send homework reminders to his home computer also sent silent harassing messages to classmates (Green: 2001). According to Pallay (2000), among High School learners in the USA, more than half have cellular phones. This has caused some schools to implement special policies. Official policy at many schools requires faculty members to confiscate electronic devices such as cellular phones and later return them to parents.

In the UK teachers are also calling on schools to consider banning pupils from bringing mobile phones into the classrooms and exam room because children might also use them to cheat in exams (http://news.bbc.co.uk).

According to Carl de Villiers – Manager of Bureau for Development and Public Relations at University of Zululand indicated that the University is in the process of implementing the policy that will disallow students to enter lecture halls and examination rooms with their cellular phones on. Such restrictions are reasonable to ensure that teaching and learning are not negatively impacted. However, it should be noted that Pelgrum and Anderson (1999:2) argue that students' use of cellular technology in education is expected to improve educational outcomes, increase technological skills, and decrease inequities between groups. Students' use of cellular technology is considered an important indicator of their preparedness to succeed and excel.

2.9.5 SAFETY AND SECURITY

The role of cellular phones in the issue of safety and security consists of two major aspects. Firstly there is the value of having mobile communication in terms of personal safety. Connected to this issue is the question of the effects of cellular phone usage on an individual's health.

Secondly there is the question of how cellular phones may contribute to compromising security in certain public locations and in terms of an individuals security.

In the case of the latter, there are locations where criminals, such as in banks and post offices have used cellular phones as a communication tool. Many of these institutions ban cellular phone use on their premises. In other cases, cellular phone signals can interfere with 'official' communications signals, such as guidance systems and on-board computer systems (avionics) on aero plane flights, and in buildings that house computer network systems (Segan 2000).

There are many documented cases where possession of a cellular phone by an individual tempts criminals to commit theft or hijacking. Cellular phone usage (without a 'hands free' kit) whilst driving has caused many road accidents and South Africa has a law that bans the use of hand-held cellular phones while operating a vehicle. This issue is of concern around the world, and both the United States and the UK are considering similar laws (Rea 2001:1-3; Chance and O'Brien: 2001).

According to Lima (1997), the fear of being stranded alone on the road is one reason more university students are buying cellular phones. More obviously, students can ring parents "when they need lifts" or require face out of the ordinary emergencies (http://news.bbc.co.ukhttp://wildcat. arizona.edu//papers/90/83/10_1_m.html: 2002).

2.10   HEALTH ISSUES

The issue of whether cellular phones can damage the health of either adults or children remains unresolved at the time of writing, although some reports suggest there may be some damaging effects on the human body. The radiation emitted by mobile phones is not x-ray radiation, but microwave radiation, and some scientists were concerned that it might actually be heating and damaging brain cells because the phone is held so close to the head.   Others have dismissed this, saying even a bout of exercise would heat the brain more than mobile phone microwaves. The Consumers' Association published research in April which showed hands-free kits - which had been promoted as a way of reducing microwave interference on the brain - could actually amplify the energy and channel it directly into the caller's cranium (http://news.bbc.co.uk/hi/english/ health/newsid%5f743000/743112. stm: 2000).

According to Biophysicist Dr Gerard Hyland, of Warwick University, children under 12 face greater risks than adults from mobile phone microwave radiation. He said researchers had found that a child's head was likely to absorb more microwave radiation than adults. The brain happens to operate on the same electrical frequency as that used by some mobile phones. The electrical activity of a young child's brain is particularly susceptible to being interfered with as it is not fully stabilised until a child is about 12 years old, and neurological development could be undermined. Child's immune system was not fully developed, and it would be less able to cope with an adverse reaction sparked by mobile phone radiation (http://news.bbc.co.uk/hi/english/education/newsid%5f59 3000/593365.stm).

CHAPTER THREE

3. THE USE OF CELLULAR COMMUNICATION AMONGST STUDENTS AT THE UNIVERSITY OF ZULULAND

3.1 UNIVERSITY OF ZULULAND BRIEF OVERVIEW

The University of Zululand is situated in a rural setting on the coastal plain 150km to the North of Durban, KwaZulu-Natal's major city. It is 35km southwest of the deep water port and industrial area of Richards Bay and 19km from the town of Empangeni.

The University of Zululand was established in 1960 as a constituent college of the University of South Africa. Initially the University catered mainly for the Zulu and Swazi ethnic groups, but in 1979 the ethnic requirement was abandoned in order to accommodate Black students from any ethnic group within South Africa. In 1979 the Durban-Umlazi campus was established. This campus is situated some 18km from the centre of the city of Durban. In 1985 the University was opened to students of all races (Facts brochure: 2000).

3.2 STUDENT PROFILE

The survey described in this chapter was conducted among students at the main campus. Of a total student population of 7425 registered students in the year 2002, 92% are black, 1% are of Asian origin, and 5.5% are white.

In 2001 a total of 6012 were registered with the University, of these 2376 males and 3636 females. Racial groups are divided into four, namely, Whites with the number of 53 students, Coloured students with the number of 26, Indians with the number of 28 students and Blacks with the number of 4439 students (Steyn: 2001).

Overall it can be reasonably stated that the investigation explores the usage of cellular phones among black university students between the ages of 17 years to the age of 35.

3.3 ESTABLISHING CELL PHONE USAGE ON THE CAMPUS

As can be deduced from the title of this chapter, the researcher's aim is to establish how students make use of cell phones for communication purposes on the main campus of the University of Zululand. This would be done using a sampling technique.

3.4   SAMPLING

The logic of using a sample of subjects is to make inferences about some larger population from a smaller one (Berg 2001:30). In this case, to make inferences about the entire student population of University of Zululand, based on the findings of a sample of the latter. Probability sampling is based on the notion that a sample can be selected that will mathematically represent subgroups of some larger population. The parameters required for creating these are restrictive but allow the investigator to make various inferential hypothesis tests. Social sciences often examine research situations where one cannot select the kinds of probability samples used in large-scale surveys, and which conform to the restricted needs of a probability sample. In these situations investigators rely upon *nonprobability samples* (Berg 2001:31).

Non-probability samples offer the benefits of not requiring a list of all possible elements in a full population, and the ability to access otherwise highly sensitive or difficult to research study populations. For example, it would be very difficult to undertake a study of active prostitutes, since it would be virtually impossible to create a list of all of the prostitutes even in a given area. At best, one might create a listing of all the known prostitutes.

Thus, frequently in the social sciences, a researcher is presented with interesting and potentially important research questions that cannot be answered by a probability sampling technique. From the perspective of qualitative research, nonprobability sampling tends to be the norm (Berg 2001:32). Communication scientists use different labels for non probability samples, but they are all descriptive of the procedures involved when drawing them. Two common types of nonprobability samples are:

Convenience Samples. The convenience sample is sometimes referred to as an, an available sample, dipstick sample accidental sample or an opportunity sample (Babbie, 1998; Mutchnick & Berg, 1996). This category of sample relies on available subjects-those who are close at hand or easily accessible. For example, it is fairly common for university professors to use their students as subjects in their research projects.

The convenience sample is an excellent means of obtaining preliminary information about some research question quickly and inexpensively. In the case of this study a convenience or opportunity sample is deemed appropriate.

Purposive Samples. This category of sampling is sometimes called judgemental sampling. When developing a purposive sample, researchers use their special knowledge or expertise about some group to select subjects who represent this population. In some instances, purposive samples are selected after field investigations on some group, in order to ensure that certain types of individuals or persons displaying certain attributes are included in the study.

Despite some serious limitations (for instance, the lack of wide generalisability), researchers often use purposive samples. (Glassner et al., 1983), particularly when conducting exploratory research, such as a pilot study and when pre-testing a measuring instrument, such as a questionnaire.

When drawing a purposive sample, a distinction can be made between a known-group sample and a quota sample. Previous knowledge of the populations and/or the objective of the study can result in a researcher using his or her judgement to select a sample. This is called a purposive known-group sample. A sample can also be called a judgment sample. Suppose we want to investigate the influence of an unofficial power hierarchy on communication flow in an organisation. Because we have

reason to believe that the management, three union representatives and the manager's secretary can provide the information needed, we select these individuals as a purposive (known-group or judgment) sample.

Du Plooy (2002 :114) defines a purposive quota sample as the sample used where previous knowledge leads to a purposive sample being drawn, that can guarantee the inclusion of certain population parameters. This approach is also relevant to this study, since the researcher, as an ex-student and now employee of the University of Zululand does have extensive knowledge of the population under study.

3.5 LIMITATIONS OF THE METHOD USED

However, one needs to be clear that drawing a *nonprobability, convenience, purposive quota sample* means that:

- every unit in the population does not have an equal and therefore probable chance of being selected as part of the sample, implying that the sample will not necessarily have the same parameters as the population;

- the researcher predicts or controls the choice of units of analysis; which can introduce bias,

- a sampling frame cannot be compiled;

- every possible combination of units cannot be drawn from the sampling frame, creating sampling bias; and

- the sample is not representative of the target population and therefore has no external validity.

These characteristics also represent the disadvantages or weaknesses of nonprobability sampling. One way to counteract the possibility that the findings were a one-time occurrence is to apply replication, which is facilitated by describing the actual sample drawn in as much demographic and other detail as possible.

Despite the disadvantages, communication researchers sometimes find themselves in a position where it is difficult or impossible to draw a random (probable) sample.

3.6 PREPARATORY SAMPLING

Before the main survey of how students used cellular phones, it was deemed necessary to establish the approximate percentage of students who make use of cellular phones. This includes students who personally own a cellular phone and those that may have been 'loaned' a cellular phone by parents or friends.

The first step was to conduct a dipstick survey to establish the percentage of students that make use of a cellular phone. A random survey was conducted across the campus at several locations and the simple question "Do you possess a cellular phone?" was put to students by the researcher. A sample of 400 students was employed. 328 students, or 82% of the sample responded affirmatively. 72 students or 18% responded negatively to the question. If we assume that this sample reasonably represents the universe of students one can surmise that approximately 80% of the student body possess cellular phones.

The researcher used a questionnaire instrument to collect data on student usage Figure 3, depicts the questionnaire instrument. A questionnaire was designed by the researcher and it was placed on the University of Zululand web site under the student's pages and in the Communication

Science department web site under students' affairs. The questionnaire was presented in a form of a 'competition' where by a student could win R200 after completing a questionnaire. The winner was chosen randomly.

When students logged into the computer there was a message informing them about the competition that contained a link that took them directly to the questionnaire. The researcher also made arrangements with lecturers to visit lecture venues to notify students about the online competition. Furthermore, printed notices were placed on the general notice boards of the University of Zululand which informed students about the competition (questionnaire).

Cell Phone Questionnaire

Welcome to our competition! Just fill in the questionnaire below to stand a chance of winning R200! The winner will be chosen randomly from the submitted entries. The purpose of the survey is to conduct research for the Department of Communication Science

Personal Information

Title

		Mr	
Miss		Mrs	
Dr		Prof.	

First names [   ]   Surname [   ]

Student no. [   ]   Age [   ]

Date* [   ]

Which racial group do you belong to?

Coloured ☐   Indian ☐   White ☐   African ☐

Other specify :.....................................

CONTACT DETAILS (OPTIONAL)

Cell phone no: [   ]

E-mail address: [   ]

PLEASE ANSWER THE FOLLOWING QUESTIONS

Question 1:   Which degree/diploma/certificate are you registered for?

```
[                                        ]
```

Question 2:   Which year of level are you in now? `[                    ]`

Question 3:   Do you possess a cellular phone?

Yes ☐   No ☐

Question 4:   If the above answer is Yes, who owns the phone?

Mine ☐   Parent ☐   Spouse ☐   Friend ☐   Employer ☐

Question 5:   Is it a contract or prepaid phone?

Prepaid ☐   Contract ☐

Question 6:   Which network are you using?

Vodacom ☐   MTN ☐   Cell C ☐

Question 7:   What do you **use** your cellular phone mostly for? In order of

importance (1=most important; 2=next most important; 3=third

most important)

7.1 This is 1st most important

Receiving calls	
Keeping contact with family	
Arranging business	
Socialising with friends	

7.2 This refers to the 2nd most important

Receiving calls	
Keeping contact with family	
Arranging business	
Socialising with friends	

7.3 This refers to the 3rd most important

Receiving calls	
Keeping contact with family	
Arranging business	
Socialising with friends	

Question 8: What is the most important **reason** for having a cellular phone?

In order of importance (1=most important; 2=next most important; 3=third most important)

8.1 This refers to the 1st most important

In case of Emergencies	
Contact with family	
Business purposes	
Fashionable	
Socialising with friends	

8.2 This refers to the 2nd most important

In case of Emergencies	
Contact with family	
Business purposes	
Fashionable	
Socialising with friends	

8.3 This refers to the 3rd most important

In case of Emergencies	
Contact with family	
Business purposes	
Fashionable	
Socialising with friends	

Question 9: Do you use your cellular phone to contact lecturers?

Yes ☐   No ☐

Question 10: Do you send or receive Short Message Service with your cell

phone?

Yes ☐   No ☐

Question 11: How many times a day do you send/receive SMS's?

_____

Question 12: What do you mainly use SMS for? In order of importance

(1=most important; 2=next most important; 3=third most

important)

12.1   This refers to the 1st most important

Emergencies	
Keeping contact with family	
Business purposes	
Socialising with friends	

12.2   This refers to the 2nd most important

Emergencies	
Keeping contact with family	
Business purposes	
Socialising with friends	

12.3   This refers to the 3rd most important

Emergencies	
Keeping contact with family	
Business purposes	
Socialising with friends	

Question 13: Do you read SMS advertisements?

Yes ☐   No ☐

Question 14: Have you bought a product based on an SMS advertisement?

Yes ☐   No ☐

Question 15: Which logo do you have on your phone?

Manufacturers ☐   Operators ☐   Other ☐

Question 16: Do you subscribe to the news services?

Yes ☐   No ☐

Question 17: Do you play games?

Yes ☐   No ☐

Question 18: If Yes, which one's?

_____

Question 19: What brand of phone if you have one, do you have?

_____

Question 20: Can you send picture logos on your phone?

Yes ☐   No ☐

Question 21: Do you use a website to send SMS messages?

Yes ☐   No ☐

Question 22: If so, which one?

_____

Question 23: Do you use your cell phone to make calls to people outside of

South Africa? If so, which countries?

_____

Question 24: How many times have you changed your ringtone this past year?

_____

Question 25: Would you agree to the University Administration or University Academics using your cell number to make contact with you for academic matters?

Yes ☐   No ☐

3.7 DRAFTING OF A QUESTIONNAIRE

According to Leedy (1993:187), a commonplace instrument for observing data beyond the physical reach of the observers is the *questionnaire*. As Sax points out (cited by Mkabela 1992:131), an "advantage claimed for the completion of a written questionnaire is that each respondent receives the same set of questions phrased exactly in the same way, as they are on standardised test.

According to Helmstader (1990:150), "there are four methods of data collection viz. interviews, mail questionnaire, observation techniques and the study of documents". In the context of the nature of investigation envisaged, the online questionnaire became the prime research tool in this study.

The main reasons for choosing the online questionnaire were the following:

- The online questionnaire method is the fastest, easiest and cheapest way to collect data without any printouts.

- It was deemed important to use an Information Communication Technology (ICT) approach since the dissertation is grounded in the technology.

- It provided an opportunity for the researcher to learn more about ICT

- It was considered impractical to interview the many students in the university because of the time constraints.

- The online questionnaire allows greater uniformity in the way the questions are asked thus ensures greater comparability in the responses.

3.8   THE PILOT STUDY

The pilot study as a preliminary trial of research measures and techniques, is essential for the development of a sound research plan. The purpose of a pilot study is to identify unclear or ambiguously formulated items. Not only should the actual questions be put to the 'participants' but they should also be asked to indicate how they have interpreted the formulated questions.

It also aimed at detecting possible flaws in the measurement procedures (such as ambiguous instructions and inadequate time limits) and in the operationalisation of the independent variables (Welman and Kruger: 1999:146). According to Leedy (1997:191), a commonplace instrument for observing data beyond the physical reach of the observer is the *questionnaire*. Data sometimes lie buried deep within the minds or the attitudes, feelings, or reactions of men and women. The first target should be to devise a tool to probe below the surface.

The pilot study conducted was to provide the opportunity to assess the appropriateness and effectiveness of the data collection instrument. A total of 50 respondents were obtained for a pilot run. The researcher analysed the answers and discovered that students misunderstood some of the questions. As a result, refinements were made to the way the questions were phrased and ordered. Technical problems related to access to and prominence of the online submission form were also solved during this phase.

The questionnaire was designed using HTML (Hyper Text Markup Language) as a submission form and edited it using Microsoft Front-

page. The questionnaire had a submission button which was linked to the technician's e-mail. After filling the form and using the 'submit' button, the response is delivered with the questions and the answers for the researcher to see which answer belongs to which question.

The questionnaire was placed on the University of Zululand web site under the student pages, (http://www.uzulu.ac.za/students/questionnaire.htm) and in the Communication Science Department web site under the students' affairs, the path was (http://www.comsci.co.za/questionnaire/index.html). The researcher was assisted by Professor J A (Bobby) Loubser from the faculty of Theology to place the questionnaire on the University of Zululand web site. To place the questionnaire in the Communication Science web site, the researcher was assisted by Neil Evans who is the department's technician. The questionnaire was placed for a period of five months before it was removed from both pages.

3.9   COLLECTION OF DATA

The researcher administrated the questionnaire through an online submission form. The responses were directed to a dedicated email address. This formed the database from which the data was analysed.

3.10 OTHER SURVEYS CONDUCTED

As part of the literature study the researcher approached eight other universities and technikons to ascertain whether they had conducted surveys on student cell phone usage.

No other institutions except the University of South Africa (UNISA) appeared to have done any research in this regard. Prof. Magriet Pitout conducted a survey in 2000 to determine the usage patterns of electronic media by communication students (http://www.unisa.ac.za).

The purpose of the survey was to provide the Department of Communication with information on the use/non-use of new technologies such as computers and the Internet in order to guide lecturers in the future development of communication courses. Survey questionnaires were posted to all undergraduate, postgraduate students and students registered for certificate and diploma courses in Communication offered at the University of South Africa.

The following results were based on a sample of 1994 students: 80 percent answered "yes" to the question whether or not they used a cell phone.

Almost three quarters of the respondents (74.4 percent) used their cellular phones daily, while 20 percent indicated they used their cellular phone on a weekly basis. Only a mere 5.4 percent reported using their cellular phones on a monthly basis. From these results it can be clearly deduced that most of the respondents used their cellular phones on a regular basis.

Regarding the question of ownership of cellular phones, of the 1944 respondents 76.7 percent indicated they personally owned the cellular phone they used, while 12.5 percent indicated that the cellular phone belonged to their parents, 9.2 percent used their spouse's cellular phone, while 8.9 percent used the cellular phone of a friend. Only about 4 percent used a cellular phone that belonged to their employer (the majority of Unisa student are employed full-time and study part-time.)

Nearly 40 percent indicated the most significant reason for having access to a cellular phone is for emergencies. This was followed by conversations with family members (24.5 percent), making business arrangements (15.4 percent), conversations with friends (13.3 percent), while contact with Unisa was limited to an insignificant 5.1 percent for contact with lecturers and 1.7 percent for contact with Unisa administration.

CHAPTER FOUR

ANALYSIS AND DISCUSSION OF RESEARCH FINDINGS

This chapter is concerned with reporting on the results of the research conducted by means of the questionnaire. Each question will be discussed and interpreted, and the results presented in the form of a table.

4.1 SIZE OF THE SAMPLE

212 responses were received or approximately 3.5% of the total student population.

4.2 ANALYSIS OF RESPONSES

Section one: **Personal Information**

The reasons for requesting personal information were twofold. First, this section provided the basic demographics necessary for the study. Second, because the questionnaire was designed as a competition with the purpose of attracting students to participate, it would be necessary to be able to contact the winner.

In this section students were asked to provide first names, surname, title, student number, date and age. Some of the information under this section was helpful, for instance, the question which asked for the person's title, enabled the researcher to identify the gender status.

Table 4.3   Student gender profile

	TOTAL	PERCENTAGE
FEMALE	117	55%
MALE	94	45%

The above table reveals that females were (55%) whereas males were (45%). The purpose of this question was to find out the gender status in the institution.

Table 4.4   Racial profile

	TOTAL	PERCENTAGE
AFRICAN	189	90%
COLOURED	18	9%
INDIAN	3	1%
WHITE	1	0%

The above table reflects that Black South Africans dominate the sample with 90%, followed by Coloured South Africans at 9%, Indian South Africans at 1% and White South Africans at 0%. Thus the findings can be extrapolated as a good measure of Black South African student usage of cell phones.

4.5   Age profile

The mean age of the people who responded is twenty-two years. This fits the youth profile of the young adult. The youngest was 16 years age and the oldest was 40 years.

Section two: Cellular phone Information

Table 4.6   Possession of a cellular phone

The results are as follows:

	TOTAL	PERCENTAGE
YES	178	84%
NO	34	16%

The finding that 84% of students claim have cellular phone correlates with the finding of the 'dipstick' survey conducted in which 82% of students said they owned a cellular phone.

Table 4.7   Ownership of the cellular phone

	TOTAL	PERCENTAGE
MINE	172	81%
PARENT	8	5%
SPOUSE	2	1%
FRIEND	28	13%
EMPLOYER	0	0%

The majority of students (81%) said the cellular phones belonged to them, 13% said they belong to their friends, 5% said the cellular phones they are using belong to their parents, 1% said the cellular phones belonged to their spouse and no one 0% possesses an employer's cellular phone.

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Table 4.8   Contract vs prepaid

	TOTAL	PERCENTAGE
PREPAID	201	95%
CONTRACT	11	5%

The majority of students (95%) said they use prepaid cellular phone and 5% said are in contract. This is possibly because the majority of students do not work, are attending full time and cannot afford contracts. The current national average is 88% prepaid and 12% subscription. (www.cellular.co.za: 2001).

Table 4.9   Choice of service provider

	TOTAL	PERCENTAGE
VODACOM	118	56%
MTN	80	38%
CELL C	13	6%

The majority of students are using the Vodacom network at 56%, MTN with 38% and Cell C with 6%.

4.10   Claimed main use of a cellphone

Question 7 in the questionnaire asked "What do you **use** your cellular phone mostly for?"

In this question students were asked to rank their choices in the order of importance (1=most important; 2=next most important; 3=third most important).

- Being able to receive calls was the most common response to the question at 50%.

- The second most important claimed use of a cellular phone was to contact family at 42%.

- The third most important claimed use of a cellular phone was to socialise with friends 43%

It is not surprising that the most claimed use of a cellular phone among students is to receive calls. Students everywhere are usually on small budgets and reception of calls is not charged for. They are therefore will normally try to avoid using airtime when ever possible. The second most important use, to maintain contact with their families, is also expected.

Young people like to socialise with friends through cell phone communications, which has become extremely fashionable and popular. This aspect becomes emphasized in the relatively high usage of SMS reflected below in 4.11.

4. 11 Claimed most important reason for having a cell phone

Question 8 asked students to rank the most important reasons for having a cellular phone. The purpose of this question was to see if there were any significant differences from the responses to Question 7 (above). That is to distinguish any differences between 'uses to which the devices are put ' and 'reasons for having the device.'

In this question students were asked to rank their choices in the order of importance (1=most important; 2=next most important; 3=third most important).

- 45% of students said their first most important reason for having a cellular phone is for use in case of emergencies.

- 40% of students said their second most important reason for having a cellular phone is to be in contact with their families.

- 41% of students said their third most important reason for having cellular phone is to socialise with friends.

The fact that use in case of emergencies was first priority demonstrates a clear emphasis on the sense of security that cell phones provide. This is supported by the second priority accorded contact with family members.

4.12 Use of cell phones to contact lecturers

The majority of students said "no" 63% and 37% said "yes". This reflects the fact that a very convenient and useful and ubiquitous channel of communication is not being fully utilized by both students and staff. As the number of students who own cellular phone is relatively high, this suggests the university authorities should consider means to make fuller use of this tool to communicate with students.

4.13 Use of Short Message Service (SMS)

95% of students said they use SMS on a daily basis and 5% said no. This reflects the fact that the SMS function is extremely popular form of communication among students in line with national and global trends.

This is a clear indication that the university officials can use this medium more effectively than at present to communicate with students.

4.14 Number of times per day that SMS is used to send and receive messages

The average number of times per day which people send or receive using the Short Message Service is six (6). This emphasises the above point that the technology could be used very effectively by the University Administration and teaching staff to communicate with students.

4.15 Main uses of SMS

In this question students were asked to rank their choices in the order of importance (1=most important; 2=next most important; 3=third most important).

- 39% of students said their first most important reason for sending/receiving SMS is in case of emergencies.

- 55% of students said their second most important reason for sending/receive SMS is to be in contact with their families.

- 51% of students said their third most important reason for sending/receiving SMS is to socialise with friends.

It is clear that students consider SMS as a vital tool for emergencies and to provide sense of security since the majority ranked it first in order of importance.

4.16 Reading of SMS advertisements

This question was to try to gauge student responses to marketing and advertising messages to ascertain whether the University might make use of SMS as a marketing tool.

Sixty percent 60% of students said "yes" they do read unsolicited marketing messages and 40% said "no". The majority of advertisements on SMS are about sales in shops or about latest movies in the cinema.

4.17 Students who have bought a product based on SMS advertisement

This question, in conjunction with the previous one, was to try to gauge student responses to marketing and advertising messages to ascertain whether the University might make use of SMS as a marketing tool.

63% responded affirmatively to have made a purchase in response to a SMS message and 37% responded negatively.

4.18   Personalisation of logos

The majority of students with 59% said they have manufacturers logos, 25% said they have operators logos and 16% said they have personalized of logos. This indicates a growing trend among students of seeing a cell phone as a fashion accessory that can be personalized.

14.19   Subscription to various news and information services

55% of students indicated that they subscribe to one or another news or information service. This is an indication that students want to be updated with information via their cellular phones.

4.20   Game playing on cellular phones

The majority of students 58% said "yes" they do play games and 42% said "no" they do not play games. .

Table 4.21   Popularity of phone brands

	TOTAL	PERCENTAGE
ERICSON	22	14%
NOKIA	89	55%
PHILLIPS	4	2%
SIEMENS	26	16%
ALCATEL	8	5%
MOTOROLA	9	6%
SUMSUNG	1	1%
SABS	2	1%

In line with national trends Nokia and Siemens are the market leaders.

4.22   Ability to send picture logos

This question was designed to determine the technological level of cellular phones used by students. Not surprisingly, the majority of students (58%) said they cannot send picture logos and 42% said they can. This is probably because most of the students cannot afford to buy latest cellular phones with the appropriate functions, for instance, a cellular phone that has enhanced message service that allows the cellular phone to send sound and pictures.

4.23   Use of websites to send SMS messages

This question was to establish how convergence of technologies (WWW, electronic mail and cellular phone, especially SMS) was impacting on students and their ability to 'connect' with these 'converged' technologies. 52% said of students "yes" and 48% said "no" to this question.

4.24   Websites used to send SMS

Vodacom is most used (57%), followed by MTN (23%). 20% of students used other sites where one can send messages. These sites can allow a person to send SMS to all three network providers, and examples of such sites are www.sawubona.co.za and www.smsguys.co.za.

4.25   Use of cellular phone to make calls to people outside of South Africa

Most of students 81% said "no" and 19% said "yes". This seems to reflect the fact that some of the students have relatives outside South Africa.

Table 4.26 **Countries most called**

	TIMES CLAIMED TO BE CALLED	PERCENTAGE
SWAZILAND	15	50%
BOTSWANA	3	10%
NAMIBIA	2	7%
LESOTHO	2	7%
MOZAMBIQUE	2	7%
NIGERIA	2	7%
GERMANY	2	7%
UK	1	3%
JAPAN	1	3%

The above table tallies roughly with the profile of international students attending UNIZUL. It also shows a trend towards the use of cellular phones to make international calls.

4. 27   Number of times the ringtone has been changed over one year.

The average number of times which people change their ringtones per year is seven (7). Most of the students like to personalise their cellular phone by downloading new ringtones from the Internet,

4.28   Attitudes towards university use of cell contact for communication

(Would you agree to the University Administration or University Academics using your cell number to make contact with you for academic matters?)

The majority of students 89% said "yes" and 11% said "no". This result indicates that university officials and lecturers could make use of students' cellular phones for communication purposes, for example to remind them of test dates or changes, submission dates, results and so on.

CHAPTER FIVE

SUMMARY, RECOMMENDATIONS AND LIMITATIONS

5.1 INTRODUCTION

This chapter presents a summary and discussion of the results of this study. Also presented in this chapter are the conclusions derived from the data and results of the analysis presented in the previous chapter. Recommendations for further study will bring this Communication Research Project to a conclusion.

It has been repeatedly indicated in this research that the use of cellular phone technologies by young people is growing fast and it is gaining popularity. There are clearly many aspects of using a cellular phone to convey messages, it might be through direct phoning or sending an SMS. However, other young people are not interested in either of the above aspects but to them what matters the most is what kind (brand) of cellular phone they own and how their cellular phone looks like.

This study highlighted the problem that the long term effects of using a cellular phone are uncertain. Scientists are still conducting some investigations about the issue of cellular phones being the cause of brain tumors and whether there is a link between mobile phones, brain tumors and other cancers.

The issue of safety and security was another effect mentioned in this study. People who carry cellular phones could become victims of violent street crimes. Lastly, it became clear in this study that cellular phones can be disturbing sometimes, for instance, in churches, funerals, airplanes, banks, post offices and other places.

5.2 SUMMARY OF FINDINGS

Each research question was formulated to obtain insight into an aspect that is considered to be essential in communication technology especially cellular phone technologies. The main outcomes of the study are organised around the research questions and they are as follows:

The three-first questions dealt with personal information of each and every respondent and that made it easy for the researcher to identify the winner as the questionnaire was set in the form of a competition. From the total number of respondents, the highest number came from females. Of the racial groups responded Africans dominated other racial groups on campus. Furthermore, from all responses the average number of age was twenty -two.

Of the respondents 84 percent said that they own a cellular phone and that those cellular phones belong to them. The majority of respondents indicated that they use prepaid phones, largely because the requirements for a contracted one, has to be permanent employment and to have a certain income. The data received shows that most of the respondents subscribed to Vodacom. During the time of the study, Vodacom and MTN were the giants in the cellular phone market, although Cell C joined the competition but it came with an intention to take Vodacom and MTN's customers.

It appeared from the findings that respondents chose 'receiving calls' as the first most important objective for them to use their cellular phone. Most of the students expect incoming calls because they can stay a month

with no airtime to call. 'Contact with family' was the second most important objective for students to use their cellular phone, however, 'socialising with friends' was the third choice for students to use their cellular phones. Most of the students are 'residential' students and therefore do not frequently see their parents and friends who they need to be in contact with.

Respondents had different reasons for them having a cellular phone, of which the first reason for them having a cellular phone was for 'in case of emergency.' 'Contact with family' was the second reason for having cellular phone and the third reason was to 'socialise with friends'

There is still a lack of communication between University officials and students because majority of students said they do not use their cellular phone to contact either academic staff or administration staff. However, 89 percent said they would agree to the University administration and University academics to use their cellular phone number to contact them for academic matters. This communication can be established in a way that University officials can come up with a particular strategy to send bulk SMS's to students because a majority of them agree that they send and receive SMS's at least six times a day.

Respondents had to indicate as to what, do they mainly use SMS for. From the responses, their first main use of SMS is for 'emergency'. For instance, a student needs assistance but has no airtime to call then he or she sends a 'call me back' message, of which that's a free service from all network providers. The second main use of SMS is to contact family and the last main use of SMS is to 'socialise with friends'. Some of the companies use SMS to advertise their products moreover majority of respondents said they do receive SMS advertisements although, most of the respondents have never bought anything that was SMS advertised.

Most of the respondents indicated that they make use the computer technology especially Internet to send SMS's and to subscribe to the news services, for instance, to receive headlines of the day or week, weather update and sports update. The majority of them said they send manufacturers logos the most, followed by operators logos and other types of logos.

In this study, it has been mentioned that most of the recent cellular phones come out with the game features of which majority of the respondents said they play games on their cellular phone. The leading brand of cellular phone most respondents use is Nokia with 55 percent and other brands shared 45 percent.

Of the respondents, 81 percent indicated that they use their cellular phone to make calls to people outside South Africa. Most of the calls are made to the African countries, few calls are made to overseas countries (check previous chapter for the table with the list of countries). Ringtones is one of the features that most of the students like to use to personalize their phones. From the findings, seven is the average number of times students change their ringtones.

5.3 RECOMMENDATIONS

Recommendations were suggested by the limitations of the present investigation and from considerations raised by the study.

- This study investigated the use of cellular technologies by the students of the University of Zululand.

There is however, a need to investigate the use of communication technologies which includes computer usage especially Internet and any other personal digital assistant (PDA).

- It may also be recommended that it would be beneficial to broaden the scope of the investigation by including University academic and administration staff.

- It may also be suggested that there is a need to revisit the study as the cellular phone technologies are continuously developing.

For instance, third generation (3G) is predicted to provide video and still images combined with voice in the future. Continuous assessment will then be necessary.

- This study has set a challenge for the University of Zululand to face by fitting itself to the new ways of communicating with students. The University officials should use students' cellular phones to inform them about important dates and events by

sending bulk of SMS's. It would also be possible to provide examination results.

5.4 LIMITATIONS OF THE STUDY

Although this study achieved its objectives, there are limitations with regard to sampling and instrument used.

The study was limited to those students who had access to computer laboratory, especially Internet and those who were computer skilled. There were those who were not computer literate but have access to cellular phone. This inevitably skewed the sample. Other limitations of the sample are discussed in section 3.4.

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