SOCIAL IMPACT OF INFORMATION TECHNOLOGY: IMPLICATION FOR A TERTIARY INSTITUTE

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ABSTRACT

Tertiary educational institutes have had many Information Systems developed and implemented for the use of students and lecturers. The problem is that more often than not, the impacts of Information Systems on social communities of organisations have not been taken into account, or insufficient attention has been paid to them. The social impact of Information Systems are rarely taken into account when systems are being designed or implemented, and as a result lead to many Information System failures. This research explores the issues of the interface between information systems and society, and addresses the social impact of these systems. A thorough investigation of the Information Systems and users of those systems at the University of South Africa has been undertaken in this study

Details regarding certain social impact of Information Systems will be discussed. This research proposes a set of guidelines to help ensure that the social impacts of tertiary institutes' Information Systems are taken into account in the design and implementation of these systems, thereby increasing the chance of success of those systems. Those who stand to benefit from information contained in this study include various tertiary institutes' faculties of Information Systems and Technology, the departments responsible for the development of those Information Systems, users of those systems, and the social community encompassing those systems.

Keywords: *Social informatics, socio-technical systems, social context, user involvement, Information Systems, Information Technology, user acceptance and technology adoption.*

DECLARATION

I DECLARE THAT THIS DISSERTATION IS MY OWN WORK.

NAME **MR HARRY MAISHE BOPAPE**

SIGNATURE DATE . .31st October 2008 . . . . . .

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I would like to thank God the almighty for giving me the strength and wisdom to work towards achieving my goal. I was able to complete this study with great enthusiasm and much vigour even when the going started getting tougher. Compiling this report would have not become a reality if it was not for the kind support and encouragement of the people close to me.

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CHAPTER 1

ORIENTATION

1.1 Introduction

A serviceable working conception of social informatics is that it identifies a body of research that examines the social aspects of computerization (Kling, 2000). Kling notes that it is the interdisciplinary study of the design, uses and consequences of Information Systems (IS) that also takes into account their interaction with institutional and cultural contexts. Due to the IS implications of this study, this research is classified in the field of Social Informatics. This research therefore explores issues the interface between IS and the community of users.

The organisation that will be studied is University of South Africa (UNISA). UNISA is the only distance learning higher education institution in South Africa. It was forced into a merger with Technikon Southern Africa (TSA) and the distance education component of Vista University (VUDEC). Its competition consists of public and private residential institutions in South Africa and abroad; and international ones that have branches in the country (UNISA, 2007).

Items that will be investigated are MyUNISA (used to facilitate learning at the institution) (UNISA2007); Electronic Delivery System (EDS) used to facilitate learning at UNISA's School of Business Leadership (SBL)) (UNISA, 2007), and Osprey (used to facilitate learning for students registered for Computer Science and IS courses). UNISA's principal intention in introducing Information and Communication Technology (ICT) is to ensure that, among others (UNISA, 2007):

- Staff and students manage productivity and efficiencies in learning and teaching;
- Academic staff obtain the required support for embarking on research;
- UNISA becomes a leader in distance learning worldwide;
- As an employer UNISA offers the best conditions in terms of staff support for all the ranks and staff categories;
- ICT improves the internal relationships of staff for improved collaborations and co- operations for teaching and research; and
- Improves the communication of UNISA staff with external networks for useful networking to improve research and teaching.

The purpose of research and problem statement of the study is given in Sections 1.2 and 1.3 respectively. The definition of terms is given in Section 1.4 followed by the delimitations of the study discussed in Section 1.5. The importance of the study/potential contribution is discussed in Section 1.6 .The discussion on the dissertation layout is in Section 1.7 and a final conclusion of the chapter is discussed in Section 1.8.

1.2 Purpose of the Research

The purpose of the study is to:

- Investigate the social impact on IS at Unisa;
- List managerial guidelines that can be used to improve IS at UNISA

1.3 Problem Statement

University of South Africa (UNISA) is one of the bigger distance learning universities in the world with over two hundred thousand (200 000) registered students for the 2007 academic year (UNISA, 2007). This current and prospective community of users try to access information on the various websites of UNISA, struggling to find the relevant information. This may be because the system designed by the authorities, is not always user friendly (see later in this section). Also, to facilitate open distance learning, academics

develop study material for students to access electronically on various UNISA sites (e.g. myUNISA, EDS and Osprey).

Students and Staff members accessing or utilizing these listed systems expressed concern during a pre-study mini-survey by e-Mail about navigating the sites to get information or accessing services. Based on various complaints and queries by students and staff members as well as informal discussions, this mini-survey was conducted by the researcher requesting the respondents (e.g. these include lecturers and students) to search three elementary items on the relevant sites. More than half of the respondents indicated that it was not easy to find the information. They argue that they spent time searching for the information jumping from one page to the other without getting the information.

The observations made by the researcher were confirmed in the management meeting of the School of Computing held 23rd May 2007. Senior Professors of Computer Science and IS complained about the difficulty in accessing information from UNISA systems, and also how and why these systems were implemented without them being socially involved (School of Computing, 2007). Specific issues of concern, which require investigation and verification on the UNISA's information and communication technology (ICT) systems, were:

- The influence of community of users' involvement in the success of systems.
- Inclusion of all user requests.
- The development of systems without consulting and involving users.

1.4 Definition of terms

This section is aimed at clarifying terms that have been used:

i) **Information Technology (IT):** IT is defined as the various technologies, which are used in the creation, acquisition, storage (Moll, 1983), organization, dissemination, retrieval, processing,

manipulation, interpretation, transmission of information to accumulate knowledge and expedite communication (Chan, 2002).

ii) **Information Systems (IS)**: The term IS has the following meaning: A system, whether automated or manual, that comprises people, machines, and/or methods organized to collect, process, transmit, and disseminate data that represent user information (Chan,2002).

iii) **UNISA**: University of South Africa

iv) **UKZN**: University of KwaZulu- Natal.

v) **myUNISA:** Is an electronic system used at UNISA for students to submit assignments, to download study material and to view their assignments and exam results.

vi) **EDS**: Is an Electronic Delivery System used by UNISA's School of Business Leadership to communicate with Master of Business Leadership students, and students to communicate with themselves and primarily for students to submit their assignments and projects.

vii) **Osprey**: Is an IS system in the School of Computing at UNISA used by lecturers to communicate to each other and students.

viii) **User involvement**: Is defined as participation in the development by a member or members of the target user group (Ives & Olson, 1984).

ix) **Socio-technical systems**: These are composed of an interrelated and interdependent mix of people, their social and work practices, the norms of use, hardware and software, the supported systems that aid users and the maintenance systems that keep the ICT's operating (Rosenbaum & Sawyer, 2000).

x) **User acceptance**: Is a conceptualized outcome variable in a psychological process that users go through in making decisions about technology (Dillon & Morris, 1996).

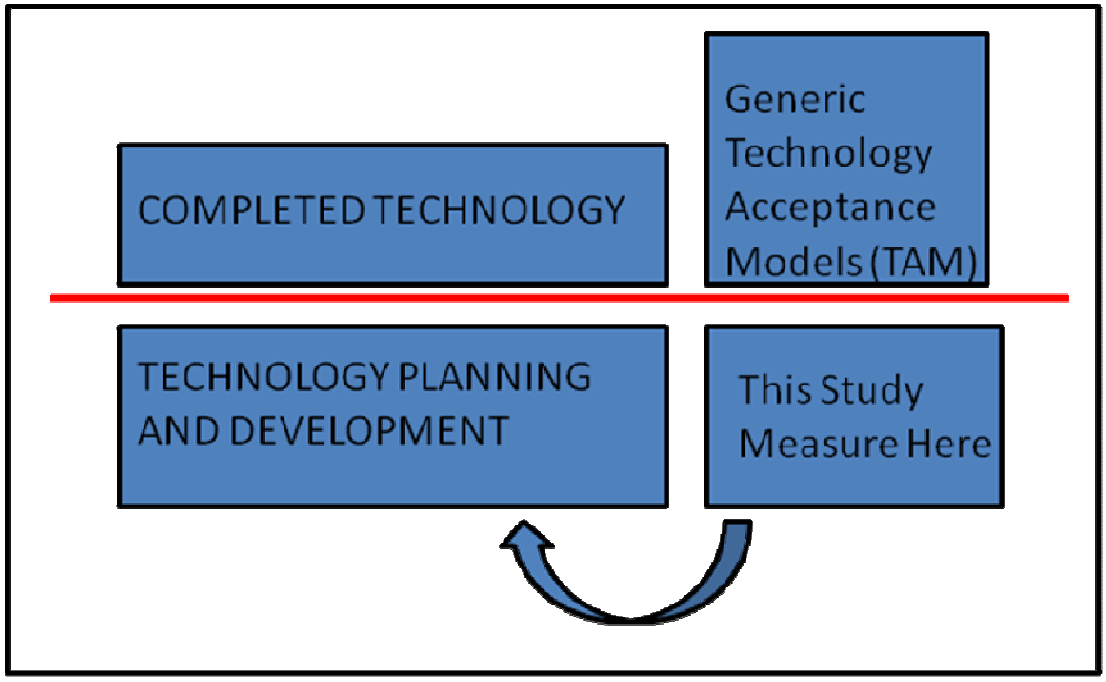
xi) **ICT:** Information and Communication Technology

1.5 Delimitation of the Study

Only one institution of higher learning, UNISA, is investigated. UNISA offers its tuition through the distance learning mode. Therefore, this study excludes residential or contact higher education institutions in South Africa since they are not distance learning institutions. It also excludes international distance learning institutions because a sample of size one cannot be externally valid, or generalisable. The research study will however only focus on the social factors and specifically user perceptions and impact of UNISA systems, namely; EDS, myUNISA and Osprey.

The Figure 1.1. below defines the delineation of the study (what the study will address).

Figure 1.1. Diagrammatic Representation of what the study will focus on



Source (Bopape, Lubbe & Klopper, 2008)

1.6 Importance of the Study

For the researcher the personal benefits are advancement with acquisition of a higher business degree, and gain research skills. On the other side this

study intends to identify the social Impact of UNISA's IS; to determine the extent to which users' were involved in developing these systems and to ascertain their willingness or lack thereof to participate in the development of these IS. This may assist in listing guidelines to be used by developers and management and this will be a way to save time and money in less worthy IS for UNISA.

1.7 Outline of the Research Report

It seems appropriate to provide an overview of how this report is structured in order for the reader to understand the logic behind the flow of the arguments that follow. This research report is organised into six chapters, the first of which consists of the introduction provided above that established the concept social impact of IS, as well as the problem statement and the objectives of the study. Chapter 2 will look at foundation of the study.

Chapter 3 will present the literature review of the study, which portray an abbreviated history of the development and workings of user acceptance.

Chapter 4 will look at the research method that was followed in the preparation of this research report that is the research process, approach and techniques utilised to collect and communicate the research data.

Chapter 5 is purely a discussion chapter that aims to resolve many of the issues highlighted in the problem statement. With the aid of the research framework introduced in the literature study combined with findings of the case study, the report attempts to achieve its main objectives. Finally, the research report is concluded with chapter 6, wherein the main themes are revisited including answers to the research questions and all findings and recommendations are put into context.

1.8. Conclusion

This chapter discussed the area which this study falls, Social Informatics which is the interdisciplinary study of the design, uses and consequences of

information technologies that take into account their interaction with institutional and cultural contexts. The problem statement and the importance of the study were among topics that were discussed in this chapter. The outline of the whole study was also presented.

The organisation that will form the basis of this study is UNISA. UNISA is the only public distance learning higher education institution in South Africa. It was formed from a merger of the old UNISA and the former Technikon Southern Africa (TSA) and incorporated the distance education component of Vista University (VUDEC).

The items that will be investigated are MyUNISA, EDS and Osprey. Chapter 2 will look at the foundation of the Study and the following concepts will be explained: IS at Tertiary Institute, Social Nature of IS, and Social Context.

CHAPTER 2

FOUNDATION OF THE STUDY

2.1 Introduction

This study's context is in the field of Social Informatics. There is some speculation about the social impact when new ICT are to be planned and developed (Kling, 2000). Questions about the consequences of new technologies are often posed in a very black and white manner. For instance: Will e-voting increase voter turnout? People expect a straightforward 'yes-or-no' answer. However, life is not that simple, and usually there are no clear-cut answers (Kling, 2000). Therefore, the social changes that might occur because of the implementation of new and complex ICT need to be analytically and empirically researched (Kling, 2000). This research explores issues of the interface between IS and the community of users at UNISA.

The research used the following key words to search for information on databases and Google Scholar: Social Context, Socio-technical systems, Social Informatics, Information Technology, Information Systems, User involvement, User Acceptance and Technology Adoption. The databases used to search information for literature review purposes are: EBSCO, Emerald, ScienceDirect and ISworld.

In solidifying the study base, this Chapter discusses IS utilisation in tertiary institutions, the social nature of IS and the social contexts of IS at tertiary institutions. It goes on to describe the types of impact the introduction and use of IS may have on the organisation and on users.

2.2 IS at Tertiary Institutes

Tertiary education institutes around the globe have had many IS developed and implemented for the use of students and lecturers/academic personnel (Hall, 2006). Hall continues that the problem is that more often than not, the impacts of IS on social communities of organisations are not taken into account, and/or insufficient attention is paid to them. He argues that, the social impacts of IS are rarely taken into account when systems are being designed or implemented, and as a result leads to many IS failures. Zmud (1981) suggests that factors such as the organization, the environment, the task, personal and interpersonal characteristics, as well as Management Information Systems (MIS), staff characteristics and policies can influence the success of system implementation.

Technological innovations have allowed educational institutions the opportunity to expand enrolment and offer courses beyond the traditional classroom setting (Clow, 1999). Distance learning delivery systems included television, interactive television, online computers and the Internet (Clow, 1999). Clow argues that students are now able to earn degrees without even setting a foot on an actual college campus. He argues that the impact of these technologies on students is a concern. Therefore, the purpose of this research is to identify the social impact of IS on UNISA's IS.

2.3 Social Nature of IS

For the purpose of this research IS is defined as the various technologies used in the creation, acquisition, storage, organization, dissemination, retrieval, processing, manipulation, interpretation, transmission of information to accumulate knowledge and expedite communication (Chan, 2002; Moll, 1983).

IS applications conceived from the perspective of rationalistic explanation of how IS used in an organization exhibit Tayloristic work design. This work design focuses on the individual's task productivity while under-estimating the

importance of the social context. This, according to Roode (2003), often leads to inappropriate application designs, difficulty of use and outright failure of many information technologies. Chaharbaghi and Willis (2000) argue that technology forms some sort of a paradox which is that individual's survival depends on the technology, but their problems also derive from it.

Therefore, IS support and facilitate human and social processes and contributes towards a meaningful work life for the users within an organization. Roode (2003) concludes that IS are developed by people for people and are therefore, rooted within human nature, which is the social context.

The "impact" that the introduction and use of IT may have on the organization, on work and on the users in an organization can either be of a technology nature, that are often explicitly known; or of a social nature, which are those that are usually not easily identifiable (Kling, 2000). Hall (2006) argues that it is important that the technological and social factors should be managed. The focus of this study is on the social factors of IS.

2.4 Social Context

According to Horton *et al.* (2005) the introduction and utilization of technology in organizational settings are more complex than technologically deterministic accounts. The social context in which IS function is specifically examined in social informatics research. This particular research can thus be considered as social informatics research. Kling (2000) describes social informatics as the body of research that examines the design, uses and consequences of ICT in ways that take into account their interaction institutional and cultural contexts. It can therefore be said that the IS social context is important when considering the areas of IS. Kling (1999) states that social context does not refer to some abstract 'cloud' that hovers above people and IS. Rather, it refers to a specific matrix of social relationships.

According to Lamb and Kling (2003) several organizations have stressed the need for a larger environmental scope when dealing with ICT use. They noted

that the individual ICT use is influenced by organizational, cultural, and global contexts, as well as by the social context within the environment. Wood-Harper and Wood (2005) inform that defining an IS in action can be construed as a paradigm of assumptions, which in turn is socially constructed. They, and Horton *et al.* (2005), conclude that technological and social practices of organizations are inseparable.

Adoption, development and use of IS are shaped by the institutional environment that envelops the IS. Lamb and Kling (2003) argue that users of IS in organizations utilize multiple ICT applications as part of their effort to produce goods and/or services while interacting with a variety of other people, and often in multiple social contexts. This simply implies that the social context within which IS operate plays a significant role and therefore must be considered when designing and implementing these systems.

According to Rosenbaum and Sawyer (2000), IS take place within a social context and are influenced by a wide range of non-technical decisions and practices. These social issues are often overlooked even though they often bear directly on the success and failure of IS. Mansell (2005) states that the social context of IS matter; is one of Rob Kling's dictums. Rosenbaum and Sawyer (2000) support this by stating that that ICT and IS do not exist in social or technical isolation. Lamb and Kling (2003) also argue that people together with their technologies comprise social networks. Therefore the technical and social issues are inseparable and must both be considered when viewing IS.

Bostrom and Heinen (1977) categorise social systems analysis into four general areas as follows:

- Individual needs, characteristics, and abilities of people in the work system
- Internal work system characteristics
- External environment of the work system

- Support system for that work system

This categorization is still relevant and used in modern times. Moreover, the various areas of analysis need to be broadened to fully account for the social context of IS. Rosenbaum and Sawyer (2000) state that the social context of IS development and use plays a significant role in influencing the ways people use IS. Thus, the social context of IS influences people' consequences for work, organizations and other social relationships. Crawford and Kling (1999) also argue that social context affects the people use of these systems.

The idea of social context is inherent when considering the social informatics research area. Social informatics research pertains to IS use and social change in any sort of social setting, which may include societies, individuals and organizations (Kling, 1999). The idea behind social informatics is that the social context of IS development and use plays a significant role in influencing the ways that people use information and technologies. Social informatics focuses on the social consequences of the design, implementation and use of IS over a wide range of social and organizational settings.

Kling (1999) states that social repercussions of new technologies are usually taken into account. These repercussions include: sponsorship of projects, training people to use new systems and controls over access to information. He goes on to suggest that these social repercussions are insufficient; and larger social context must be taken into account.

According to Kling and Star (1998), the idea of human centered systems promises that the knowledge of human users and social context in which systems are expected to operate, become integrated into the design and implementation of systems. When using human centered analysis, one must take into account the various social units that structure work, information, organizations and teams, and communities and their distinctive social processes and practices.

Amory (2003) suggests that the development or selection of appropriate systems need to take into account institutional and current user needs. This

can only be done by taking the social context of the IS into account and carrying out a thorough analysis thereof.

2.5 Conclusion

This chapter discussed IS at tertiary institutions in particular the design and implementation of these systems. It also discussed the Social Nature of IS and the Social Context of IS. It discussed what Social Informatics is since this research is in this field of study. Lastly, it discussed people together with technologies.

Social issues are often overlooked even though they often bear directly on the success of IS (Mansell, 2005). ICT and in fact all IS do not exist in social or technical isolation (Rosenbaum & Sawyer, 2000). Therefore technical and social issues are inseparable and must be both considered when viewing IS (Kling 2000). The knowledge of human users and social context in which systems are expected to operate should be integrated into the design and implementation of systems.

IS support and facilitates human and social processes through IT and contributes towards a meaningful work life for the users within an organisation. According to Lamb and Kling (2003) social context within which IS operate plays a significant role and therefore must be considered when designing and implementing the system.

The next Chapter present literature review where theory and some models are discussed. Shortcomings of these models will be highlighted and aspects concerning IS usage will also be discussed. The Research question will also be discussed.

CHAPTER 3

LITERATURE REVIEW

3.1 Introduction

This particular research can be considered as social informatics research. Kling (2000) describes social informatics as the body of research that examines the design, uses and consequences of ICT in ways that take into account their interaction institutional and cultural contexts. It can therefore be said that the IS social context is important when considering the areas of IS.

This research is about the social impact of UNISA's IS. Its aim is to determine to what extend were UNISA's community of users were involved in the development and planning of IS. The social factors that influence technology usage were thus determined because Havelka (2002) argues that it could influence the success of a proposed system.

As indicated in the previous Chapter, the research used the following key words to search for information on databases and Google scholars: Social Context, Socio-technical systems, Social Informatics, Information Technology, Information Systems, User involvement, User Acceptance and Technology Adoption. The databases used to search information for literature review purposes are: EBSCO, Emerald, ScienceDirect and ISworld. The author of this dissertation has used recent articles for the literature survey as far as possible, but older articles were also used as they still have relevance to this study.

The following in this chapter of literature review will be discussed: Impact of IS on the social community within institutions, Influences of IS on the Social relationships of users, Development and/or planning of the IS. User

involvement and participation in relation to IS success, IS Usage and Factors influencing IS Usage.

3.2 Impact of IS on the social community within institutions

In educational contexts, the changes brought by the introduction of IS have variously been perceived as either: a great good (Hill, 1999), a virulent evil (Brabazon, 2002), or neither (Shields, 2000). Regardless of its relative value, all the above authors agree that IS has greatly impacted education activities, aims and aspirations. Yusuf (2005) also supported the above three in saying that the field of education has not been unaffected by the penetrating influence of ICT. Yusuf argues that ICT have impacted on the quality and quantity of teaching, learning, and research in traditional and distance education institutions.

As IS has developed, it has provided increasing opportunities, options and strategies for education (Hill, 1999). Kroeker (2000) argues that the prevalence of IS has generated an expectation that all education institutions will have a virtual as well as a physical location, and that students can access of the information they need via a web browser. This capacity of IS to modify traditional understanding of the location of education, suggests the need for a completely different set of social and institutional infrastructures with which learning can be facilitated (Shields, 2000).

Dertouzos (1998) argues that the current reformation of IS directly impacts education, since it mediates the way information is accessed, organised, stored and transmitted; while Watson (2001) argues that IS brings about change in the way information is also learnt and taught. These changes of access, learning and teaching have particular bearing on education and impact social community within institutions.

While education has historically been centred on teaching and learning, Duderstat (1999) argues that IS has affected changes to the aims of education. Education is therefore increasingly perceived as the process of creating, preserving, integrating, transmitting and applying knowledge. IS

particularly impacts course content and teaching methodology and the recruitment and training of teaching staff (Hill, 1999).

In considering the impact of IS, changes have been evident in the methods (Hill, 1999; Shields, 2000; Watson, 2001), purpose (Dunderstat, 1999; Hill, Shields, 2000), and the perceived potential of education (Duderstat, 1999; Hill, 1999; Kroeker, 2000). While various authors have differed in their opinion of the degree, desirability and destiny of these changes, they all agree that change processes have certainly been underway which impact socially on the individual interacting with this technology.

For people trying to use these various technologies in a domestic setting for educational purposes, there are a range of potential problems and possibilities that are not simply attributes of the technologies *per se*, but arise from the relationship of the technologies with the social environment (Kirkwood, 2000). Kirkwood (2000) argued that research with students and all other community of users is necessary in order to reveal the significance of the diversity of learners' experiences and contexts. This could mean their involvement in System Development and Planning.

3.3 Influences of IS on the Social relationships of users

3.3.1 Theory of Reasoned Action (TRA)

This section discusses the Theory of Reasoned Action (TRA) and the Theory of Planned Behaviour (TPB). Both are discussed with the intention to explain the context of their influence on the social relationships of UNISA people.

TRA is a widely studied model in social psychology (Malhotra & Galletta, 1999; Kwon & Chidambaram, 2000; Pedersen, 2003). It attempts to explain why people behave as they do in situations of 'reasoned action' by identifying causal relations between beliefs, attitudes, intentions and behaviour (Kwon & Chidambaram, 2000; Barnes & Huff, 2003; Pedersen, 2003). Attitude is defined as the individual's positive or negative feelings about enacting a target behaviour (Uzoke *et al*., 2006). TRA is illustrated in Figure 3.1. on the next

page. TRA has the following components (Fishbein & Ajzen, 1975; Malhotra & Galletta, 1999):

1 Actual behaviour

According to TRA a person's performance in a specified behaviour is determined by the behavioural intention (BI) to enact the behaviour.

2 Behavioural intention (BI)

BI is jointly determined by the person's attitude (A) and the subjective norm (SN) concerning the behaviour in question, with relative weights estimated by regression (Davis *et al*., 1989).

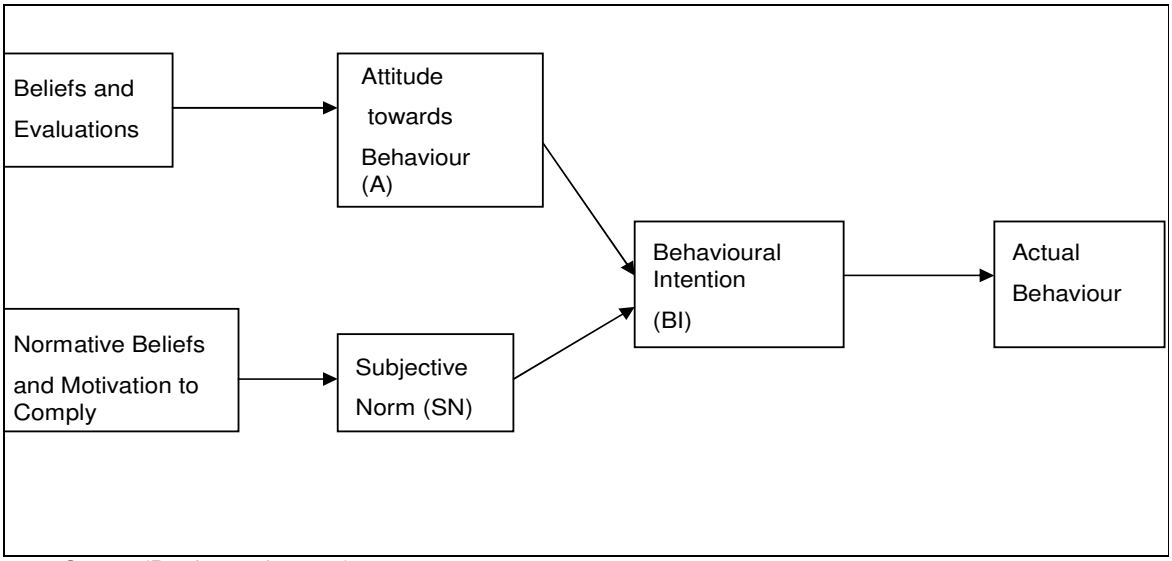
3 Attitude towards behaviour (A)

A person's attitude towards behaviour is determined by their salient beliefs (b_i) about the consequences of performing the behaviour multiplied by the evaluation (e_i) of those consequences.

4 Subjective norm (SN)

Subjective norm refers to the social pressure exercised on the person to either enact or not enact the behaviour (Kwon & Chidambaram, 2000) and is expressed as the sum of all the person's normative beliefs (nb_i), which consists of the perceived expectations of specific significant individuals or groups' reaction, multiplied by the person's motivation to comply (mc_i) with these expectations:

Figure 3.1: Diagrammatic representation of the TRA



Source(Davis *et al*., 1989)

TRA is a general model and it does not specify the active beliefs for a specific behaviour. Therefore a researcher using TRA has to identify the beliefs that are relevant for subjects regarding the behaviour under investigation.

Through IS more people are able to network and thereby ensure they contribute to the impact they can have on the systems they use (Mao, 2002). They are also able to appreciate one another even though there are cases where they may be breakdown of trust due to increased networking (Levy,2005), which is another form of Social Impact. What one notes is that more people are able to understand where they can obtain specific types of information. Those who want to collaborate in research can also find each other more easily (Levy, 2005). TRA is thus enhanced through IS because causal relations can easily be identified. The increased networking often improves attitudes of people with common interests. As a result their intentions tend to become more positive, and their behaviours can be easily improved.

3.3.2 Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB), on the other hand, extends TRA to account for conditions where individuals do not have complete volitional control over behaviour (Taylor & Todd, 1995). This is discussed because it could impact the community of users during their involvement in systems planning and development. The inclusion of a third determinant of a behavioural intention, perceived behavioural control, is TPB major point of departure from TRA. The difference results in TPB recognising that not all behaviour may be under individual's control (Ajzen & Madden, 1986). TPB was formulated to predict behaviour across many settings; it has been shown to be relevant in explaining IS use (Mathieson, 1991).

According to TPB model, behaviour is determined by the intention to perform the behaviour. Intention to perform is determined by three factors: attitude

towards behaviour, subjective norm and perceived behavioural control (Mathieson, 1991). In IS context, where the behaviour to be performed can be quantified as system usage, attitude towards behaviour can be described as an individual's favourable or unfavourable evaluation during development or planning of a specific system, while subjective norm can be seen as the perceived social pressure to be involved or not to be involved in the said system. Perceived behavioural control relates to the degree to which an individual believes that he/she has control over personal or external factors that may facilitate or constrain system use (Venkatesh & Brown, 2001).

TPB goes further to include another level- the underlying cognitions and/ or beliefs that lay the foundations for the above-mentioned factors (attitude, subjective norms and perceived behavioural control). As shown in the Figure 3.2 below, attitude is explained as a function of the combined effect of behavioural beliefs and outcomes evaluations (Mathieson, 1991). The behavioural beliefs relate to the favourable utilitarian, hedonic and social outcomes that can result from performing the behaviour (Venkatesh & Brown, 2001). Subjective norms reflect the perceived opinions of a person or group whose beliefs hold importance to the individual (Mathieson, 1991). The second element comprises the motivation to comply, which is a degree to which an individual desires to fulfil the wishes of person or group. This is useful if a person represents a group during technology development and/ or planning.

Figure 3.2: Theory of Planned Behaviour

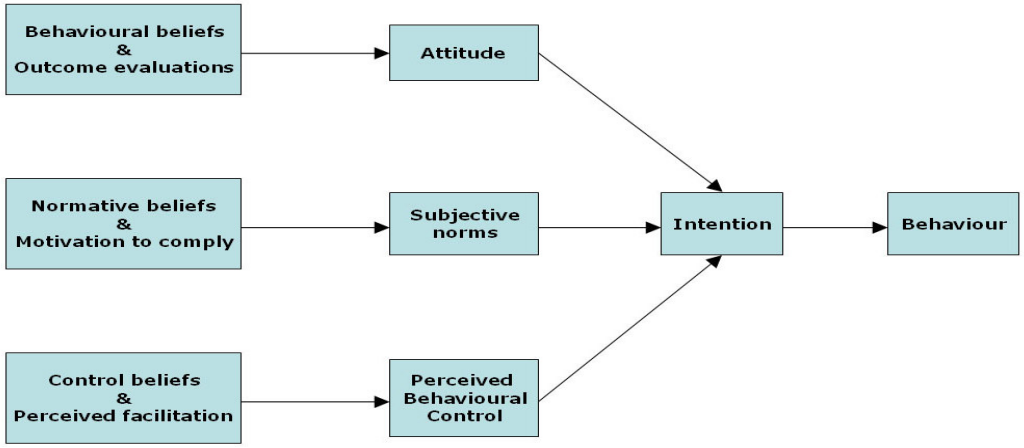


Figure 3.2: Source (Ajzen, 1991)

Perceived behavioural control (PBC), as was initially stated, is the point of departure of TPB from TRA. It refers to an individual's perceptions of the existence or non-existence of the resources, skills or opportunities required to use an IS or some system features (Ajzen & Madden, 1986). PBC suggest that the motivation of an individual is affected by the complexity of certain behaviour and by his or her perception of how successfully s/he can perform behaviour.

With PBC being a product of an individual's control beliefs and perceived facilitation (Mathieson, 1991); it follows that an individual will have enhanced perceived control over behaviour if s/he has strong beliefs about the presence of elements that will assist the performance of such behaviour. The reverse is also true. That is, an individual who has a strong control beliefs that hinder the performance of behaviour will as a result, have a diminished sense of control. Control beliefs comprise both internal (i.e. have skills and abilities to use a system) and external factors (i.e., situational or environmental) and is important during the systems development and/or planning.

TPB model have some limitations. It is grounded on the belief that people think rationally, making logical decisions based on the information available to them, unconscious motives are not taken into consideration as well as demographic and personality variables (Godin & Kok, 1996). This could impact on systems development and/or planning if the person does not convey the message from his/her group

TPB is visible in people who get hooked to the changes and the flexibility that is afforded to employees who obtain extra support in the homes and at work to be able to carry out their duties like system development/planning. Some people may, for example, use working hours to do household chores such as shopping and visiting friends, and perform professional duties at times that were meant for their own resting. Such flexibility is not always planned, some may occur due to emerging moods and anxieties resulting from acquiring IS tools. In general, TPB also enhances improvements in work efficiencies such as system development and/or planning.

3.4 Development and/or planning of the IS

Users may be allowed to provide input regarding their work requirements for development and implementation of an IS. In such a case the results of an IS are likely going to lead to useful results. Innovation may result from increased input of people who use the IS. Interesting is that in an IS, the benefits of such an IS will be distributed back to the people who contributed, and to other members of the communities.

Rogers (2003) developed the innovation diffusion model to explain how an innovation diffuses through society. This model was used to explain the acceptance or rejection of IT innovations in an organisation or society (Urbaczewski *et al*., 2002). According to Rogers (2003), a system development and/or planning is an idea, a practice, or object that is perceived as new by an individual or another unit of adoption. Diffusion is the process by which a system development and/or planning is communicated through certain channels over time among the members of a social system. The rate of usage is determined by the characteristics of an innovation, which, according to Rogers (2003), are as follows:

- Relative advantage described as the degree to which a system development and/or planning is perceived as better than the idea it supersedes.
- Compatibility refers to the degree to which a system development and/or planning is perceived as being consistent with the existing values, past experiences, and needs of potential adopters.
- Complexity is the degree to which a system development and/or planning is perceived as difficult to understand and use.
- Trialability refers to the degree to which system development and/or planning may be experimented with on a limited basis.
- Observability refers to the degree to which the results of system development and/or planning are visible to others.

In the domain of IS, Moore and Benbasat (1991) built on the work of Rogers, amongst others, and expanded the array of innovation characteristics to

seven. Three of the seven innovation characteristics are directly borrowed from Rogers: relative advantage, compatibility, and trialability. The fourth characteristic, ease of use, is a close relative to Rogers' complexity. It is worth noting that both relative advantage and ease of use are subjective characteristics since they can be viewed differently depending on an individual's perceptions.

Moore and Benbasat (1991) also derived three further characteristics. While Rogers (1983) included image as an internal component of relative advantage, Moore and Benbasat (1991) found it to be an independent predictor of adoption. Image is the self-perception that adopting a system development/planning could result in enhanced social status for an individual amongst his/her peers (Agarwal & Prasad, 1997). The final pair of characteristics, results demonstrability and visibility, are derived from Rogers' observability characteristic. Result demonstrability is defined as the tangibility of the results of adopting an innovation, and visibility as the degree to which prospective users see an innovation as being visible in the adoption context (Moore & Benbasat, 1991; Agarwal & Prasad, 1997).

Moore and Benbasat (1991) remind us, however, that these definitions are, in fact, based on perceptions of the system development and/or planning itself, and not on the perceptions of actually using the system. As Fishbein and Ajzen (1980) concur, attitudes towards an object and attitudes regarding a particular behaviour relating to that object can frequently differ.

However Ling (2001) noted the following problem with Rogers's model:

- The model assumes that users behave in a rational way by weighing positive and negative factors. This does not acknowledge the influence of broader social processes.

3.5 User involvement and participation relation to IS success

3.5.1 Domestication

The domestication theory was founded by Silverstone and Haddon (1996) who view technologies as social, cultural, political and economic products which play a symbolic and aesthetic as well as material and functional role. It entails having to consult users regarding issues of relevance in their work and obtaining buy-in for own ideas. Pedersen *et al.* (2002) distinguish between the first system development and/or planning decision, which refers to decision, and post-start decisional behaviour. They recommend that system development and/or planning be seen as a transition between stages of increasing consumer sophistication in the consumer life cycle rather than a specific event. Brown and Randell (2004) uses the term 'dwelling' with technology to describe the study of technology system development and/or planning over a long period of time where the context in which technology is used may change. These are the grounding ideas for domestication.

The concept of domestication was derived from the British studies on consumption (Sun, 2004). It refers to the taming of a system development and/or planning by the individual and focuses on the process that integrates technology into everyday domestic life (Pedersen, 2003). The domestication approach considers the following phases in the adoption process (Silverstone & Haddon, 1996; Ling, 2001; Habib, 2003):

- *Commodification:*

  The way a technology is designed to give it an image with a number of functional, aesthetic and symbolic claims.

- *Imagination*

  The way in which a system development and/or planning enters our consciousness

- *Appropriation*

  The actual production of the technology

- *Objectification*

  The phase in which the technology system development and/or planning is acceptable and familiar in the daily life of the consumer.

- *Incorporation*

  Integrating the technology with daily use
- *Conversion*

  The technology becomes fitted into routines and is seen by others as part of the individual's identity.

The domestication approach considers system development and/or planning rather than mere use, and views adoption as a process rather than a specific event (Ling, 2001; Haddon, 2003). The domestication approach aims to discern the interaction between the innovation and the context in which it is being placed. Therefore contexts are often contrasted, for example work versus leisure, private versus public, and contrasts between users in different demographic groups (Ling, 2001).

Domestication studies do *ex post facto* examination of system development and/or planning to understand why a technology has been adopted and why not (Pedersen, 2003). It is intended as a tool for observing adoption rather than a tool for the prognosis of an adoption (Ling, 2001).

This research views users as social entities, which is in accordance with the domestication approach. The acknowledgement of the importance of context and the post-adoption focus make the domestication approach relevant to understanding the factors that influence system development and/or planning.

3.5.2 Technology Acceptance Model

User attitudes and beliefs can influence the kinds of IS to be planned and developed in an organisation. The Technology Acceptance Model (TAM) does not get involved with the impact of social considerations during systems development and planning (Davis, 1989). The goal of TAM is to provide an explanation of the determinants of computer acceptance that is general, capable of explaining user behaviour across a broad range of end-user computing technologies and user applications (Davis *et al.*, 1989). TAM, as illustrated in Figure 3.3 in the next page, includes six concepts (Davis *et al.*,

1989) but none of them measure user involvement during system development and/or planning (see Figure 1.1).

1. ***External variables (EV)***

   External variables influence perceived usefulness (*PU*) and perceived ease of use (*PEOU or PEU)*, for example demographic variables.

2. ***Perceived usefulness (PU)***

   Perceived usefulness is defined as the extent to which a person believes that using the system will enhance his or her job performance (Venkatesh & Davis, 2000).

3. ***Perceived ease of use (PEU)***

   Perceived ease of use is the extent to which a person believes that using the system will be free of effort (Venkatesh & Davis, 2000).

4. ***Attitudes towards use (A)***

   Attitude towards use is defined as the user's desirability of his or her using the system (Malhotra & Galletta, 1999). Perceived usefulness (*PU*) and perceived ease of use (*PEU*) are the sole determinants of attitude (*A*) towards the technology system. Perceived usefulness and perceived ease of use is determined by external variables (EV) and attitudes toward use (A).

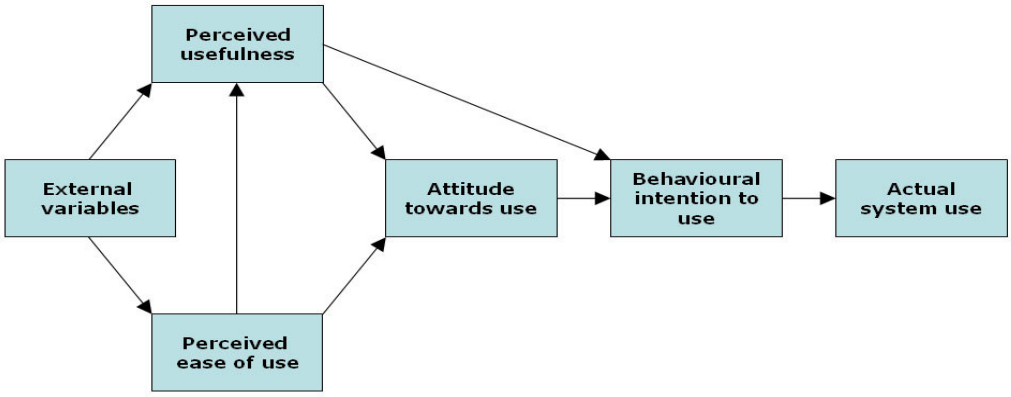
5. ***Behavioural intention (BI)***

   Attitude (*A*) combined with perceived usefulness (PU) predict behavioural intention (*BI*):

6. ***Actual use***

   Behavioural intention (*BI*) in turn predicts actual use.

Figure 3.3: Technology Acceptance Model



Source: Davis *et al*., (1989)

The attitude towards adopting a technology is believed to be the result of personal and social influences and the fact that TAM does not account for social influence is a limitation (Davis *et al*., 1989).

Adams *et al*. (1992) evaluated the psychometric properties of the usefulness constructs by examining the usage behaviours of users of voice and electronic mail systems. They also tested the same constructs using office applications developed and planned popular at the time. Despite both studies demonstrating the robustness of the two scales of measurement, the authors declared their concern that the relationship between the two may be more complex than appears at first. Segars and Grover (1993) endorsed this concern and remind users that absolute measures for these constructs may not be possible across varying technological and organisational contexts.

In their study of organisational adoption of voice-mail systems, Straub *et al*. (1995) attempted to tackle the conceptual and methodological issues pertaining to the measurement of system usage with TAM. They compared subjective and objective measures of obtaining system usage data from subjects and found little correlation between the subjective self-reported results received from their subjects and the objective usage results captured by computer logging but again nothing about user involvement during system development and/or planning. The author discussed TAM to show that he is

aware of other issues to show technology acceptance. However, this study deals with the area below the line see figure 1.1.

3.5.3 Shortcoming of Generic Technology Acceptance Models

In this section the shortcomings of TAM and UTAUT Models are addressed. Malhotra and Galletta (1999) did a study for understanding the role of social influences as they relate to individual acceptance and usage behaviour in organizational implementation of new IS and no reference to social impact was done. According to Malhotra and Galletta (1999) social influence processes determine the individual user's commitment, or more specifically, psychological attachment to use of any new IS and again no Social Impact is addressed, no user involvement is considered in the development and/or planning of these systems.

Being a predictive model, limitation of TAM is the fact that it can be non-specific, with individual cases not assigned as much value as the far-reaching generic facts that allow the prediction of generic outcomes. Its nature as primarily a predictive tool also proves restrictive when seeking motives for specific observed behaviours. Furthermore, the underlying assumption of TAM is that beliefs concerning ease of use and usefulness are always the principal determinants of any use decision (Mathieson, 1991).

A problem arises in situations where other variables besides ease of use and usefulnes*s* predict intention. In that regard, however, more flexible models such as the Theory of Planned Behaviour (TPB) do exist, but that flexibility comes at the expense of being far more complicated to apply to real-life situations. On the other hand, TAM's great advantage is that its constructs are always measured in the same fashion, regardless of circumstance, but, then again, this comes at the expense of being too generic. Davis (1989), one of the pioneers of TAM, has admitted that his model requires further research to shed more light on the generality of (its) findings.

3.6 IS Usage

IS usage is viewed as not strictly encompassing hardware and software usage, but also the services that surround the technology and people and procedures that support their use (Taylor & Todd, 1995). IS usage has been demonstrated to be a key driver of organizational performance (Premkumar & Bhattacherjee, 2006). However, it is not uncommon that after they spend many resources in the implementation of a state-of–the-art technology, organisations have difficulty promoting the usage of the technology among the end-users (Mao, 2002). He argues that management of IS usage requires a continuous attention from managers. Mao (2002) further argues that systems development efforts be focused on issues that affect usage, such as user involvement in systems planning and development.

3.6.1 Factors Influencing Involvement during Systems Development and/or Planning

Jones and Marsden (2005) argue that an IS usability is affected by two factors: its intrinsic ease-of-use - the way it presents its functionality, the feedback given to users and more; and how well it fits in with other resources at the user's disposal. The importance of compatibility with other relevant resources and services is supported by Balaij (Balaji *et al*., 2005). This must be the reason for user involvement during system development/planning.

3.6.2 Requirement Gathering during Systems Development and Planning

IS requirements-gathering process is a critical first step in the IS development or planning process (Havelka, 2000). Havelka (2000) argues that it is the critical phase to extract the project information from the client in a systematic way. He noted that IS requirements are too frequently incomplete, inconsistent, or incorrect, often, the reasons for this failure have less to do with technologies than with people and management (Havelka, 2000). This highlights the importance of social informatics as defined by Kling (2000) in section 3.1 and the importance of user involvement. Kling (2000) stated that

when developing and planning new technologies it is important to clarify how far technology does, or does not, condition social change and this can be achieved by requirement gathering process during systems development and planning to uncover user needs.

3.7 Critical application of Literature

The development and planning of IS is a complex process that entails a mix of technological, social and organizational interactions (Gal & Berente, 2008). It involves multiple stakeholder groups which have varying needs, interests and capabilities (Gal & Berente, 2008). Gal and Berente (2008) suggest that different groups may have different interpretations and perceptions of the developed and planned technology and its purpose, hence their involvement in the initial stage of IS projects is necessary for the projects to be successful.

The key to the successful diffusion of advanced IS is whether new applications are responsive to the social, economic and cultural conditions within which people work and live (Crede', 1996). Crede' (1996) argues that involvement of users at an early stage of development and planning allows early identification of key choices available to users and producers of IS.

The improved understanding on the part of users of their own requirements and the changes in the environment in which they operate is needed if advanced applications are to be incorporated successfully within commercial and consumer lifestyle (Crede', 1996).This suggests the need to move beyond awareness campaigns towards measures which enable users to learn and fully understand how IS can address their needs (Crede', 1996). This might mean users need to be involved in the development and planning of IS. Lastly how the designed and implemented IS at impact socially on the community of users is not directly or specifically addressed by literature and this research attempts to address.

3.8 Research Question

The literature study addressed the history of the social impact of IS. Most of the issues have been addressed but the following still remain an issue:

- Does the social relationships of users during system development and/or planning impact on IS?
- To what degree are the users of the UNISA IT involved and participate in the development and/or implementation of these systems?
- How does user involvement and participation relate to IS success?
- What social factors influence the development and/or planning of IS?

3.9 Conclusion

This chapter was the literature review. The following aspects were discussed: Impact of IS on the social community within institutions, Influences of IS on the Social relationships of users, Development and/or planning of the IS. User involvement and participation in relation to IS success, IS Usage and Factors influencing IS Usage.

IS are social systems rather than technical systems (du Plooy, 1999). Computer systems structure social relationships and not just information. It can therefore be said that IS's affect more than just the way that users perform tasks (Kling, 1999). The development and planning of an IS is a social process involving users and systems analysts, carried out in an organizational setting, and therefore as a social process have social consequences (Lamb & Kling, 2003).

Theory and some models were discussed. Shortcomings of these models were highlighted and aspects concerning IS usage were also discussed. People trying to use these various technologies in a domestic setting for educational purposes, there are a range of potential problems and possibilities that are not simply attributes of the technologies *per se*, but arise from the relationship of the technologies with the social environment (Kirkwood, 2000).

The next Chapter will discuss the research methodology used in this research. Details about the methodologies used to gather primary and

secondary data will given, as well as the methods used to analyze the data collected from the study. The research questions are also restated in the next chapter.

CHAPTER 4

RESEARCH METHODOLOGY

4.1Introduction

This study's context is in the field of Social Informatics. Social Informatics research orientation is analytical, which refers to studies that develop theories about ICT in institutional and cultural contexts or to empirical studies that are organised to contribute to such theorizing. This type of research seeks to contribute to a deeper understanding of how the evolution of ICT uses in a particular setting can be generalized to other systems and other settings (Lamb & Sawyer, 2005). Due to the IS implications of this study, this research falls within the parameters of the department responsible for the development of UNISA's Information Systems.

The previous chapter presented literature review on aspects that form the theoretical basis for the empirical study. This chapter discusses the research methodology, which is aspect of the research undertaking. In order to answer the research questions that were developed in the previous chapters, it is necessary to design a research method. This is applied in order to practically find answers to these questions. The essence of this research was to elucidate the current IS within the UNISA. This chapter discusses the manner in which the investigation of the problem takes place, which is called the research methodology (Cohen & Manion, 1994: 116; Schalock & Felce, 2004: 271).

The broad research questions were: What is the impact of the UNISA IS within the institution? In what ways does social relationships of users during system development and/or planning impact on IS? To what degree are the users of the UNISA IS involved and participating in the development and/or planning of these systems? How does user involvement and participation

relate to IS success? What social factors influence the development and planning of IS?

In the sections, which follow, there will be a discussion on the types of data in research, the Likert Scale, the method of data collection chosen (i.e. questionnaires), types of questions that were asked and development of the questionnaire, steps taken to validate the questionnaire, the survey population and sample size determination and data handling. Finally a chapter conclusion will be presented.

4.2 Data Collection

4.2.1 Primary and Secondary Data

According to Lubbe and Klopper (2005), data can be from either a primary or secondary source. Lubbe and Klopper (2005) *cite* the Wolfgram Memorial Library (undated) that defines a primary source as firsthand testimony or direct evidence concerning the topic under investigation. Similarly, where one undertakes to collect new data, this data is known as primary data (Saunders *et al.*, 2003). Sources of primary data include, amongst others, interviews, questionnaires, research data, letters and speeches (Lubbe & Klopper, 2005).

On the other hand, data that has already been collected for some other purpose is known as secondary data (Saunders *et al.*, 2003). Lubbe and Klopper (2005) state that a secondary source interprets and analyses primary sources. Saunders *et al.* (2003) argue that secondary data include both quantitative and qualitative data, and can be used for both descriptive and explanatory research, and further *cite* Kervin (1999) who states that this data could be either raw (little or no processing) or compiled (received some form of selection and summarising). There are three main sub-groups of secondary data, namely documentary data, survey-based data, and those compiled from multiple sources (Saunders *et al.*, 2003). Documentary data include, amongst others, books, journals, websites of organisations and newspaper articles (Saunders *et al.,* 2003).

4.2.2 Qualitative and Quantitative Data

Lubbe and Klopper (2005) differentiate between two research paradigms, namely, quantitative and qualitative and state that the research question will determine the researcher's choice between them. Saunders *et al.* (2003) find that some authors (e.g. Bryman, 1988 & Easterby-Smith *et al.*, 2002) attempt to draw a distinction between qualitative and quantitative research, but also *cite* Silverman (1993) who finds that attempts to define qualitative research, and therefore the way in which it is distinguished from quantitative research can be problematic. However, Saunders *et al.* (2003) find that there exist significant distinctions between these two forms of data, as tabulated below, as developed by them from Dey (1993), Healey and Rawlinson (1994) and their own experience:

Quantitative data	Qualitative data
• Based on meanings derived from numbers	• Based on meanings expressed through words
• Collection results in numerical standardised data	• Collection results in non-standardised data requiring classification into categories
• Analysis conducted through the use of diagrams and statistics	• Analysis conducted through the use of conceptualisation

Table 4.1 Distinctions between quantitative and qualitative data

Saunders *et al.* (2003) *cite* Dey (1993, p.28) who states that more ambiguous and elastic our concepts, the less possible it is to quantify our data in a meaningful way. They further *cite* Robson (2002) who finds that qualitative data are associated with such concepts and are characterised by their richness and fullness based on the opportunity to explore a subject in as real a manner as possible.

According to Saunders *et al.* (2003), quantitative data can be classified into data types using a hierarchy of measurement, often in an ascending order of

precision, and *cite* Diamantopoulos and Schlegelmilch (1997), in this regard. They further assert that these different levels of numerical measurement will dictate the range of techniques available for the presentation, summary and analysis of the data.

Saunders *et al.* (2003) state that quantitative data can be classified into two distinct groups, namely categorical and quantifiable, where categorical data refer to data whose values cannot be measured numerically but can be classified into sets or categories according to features of interest or placed in rank order, while quantifiable data are those whose values that can actually be measured and quantities can be assigned. Descriptive (or nominal) data is a sub-category of categorical data, where it is not possible to rank the data (e.g. a car manufacturer may classify vehicles into descriptive categories such as hatchback, saloon or estate) (Saunders *et al.*, 2003). Ranked (or ordinal) data represents another sub-category of categorical data where the definite position of each case within a set is known (Saunders *et al.*, 2003), and the ranking of staff in an organisation is an example (e.g. 1 is assistant officer, 2 is officer and 3 is chief officer) (Welman & Kruger, 2001).

Quantifiable data is more precise than categorical data as it is possible to assign each data value a position on a numerical scale (Saunders *et al.*, 2003). There exit two sub-categories of quantifiable data, namely continuous and discrete (Saunders *et al.*, 2003). Saunders *et al.* (2003) *cite* Morris (1999) who states that continuous data are those whose values can theoretically take any value (sometimes within a restricted range) provided that accurate means are available to measure them (e.g. furnace temperature, distance, time taken). On the other hand, discrete data can be measured precisely, where each case takes one of a finite number of values from a scale that measures change in discrete units (Saunders *et al.*, 2003). These data are often whole numbers (integers) such as the number of customers served, but could include non-integer values (i.e. fractions) as well such as with shoe sizes, for example (Saunders *et al.*, 2003).

As one moves from descriptive categorical data to discrete quantifiable data, increased precision in measurement is possible, and the more precise the level of measurement, the greater the range of analytical techniques available (Saunders *et al.*, 2003).

4.3 The Likert Scale

Likert scales are categorical ordinal scales used in social sciences to measure attitude(Likert Scales,2006) and are therefore used to gather quantitative data (as per discussions above). According to Welman and Kruger (2001), the summated or Likert scale was introduced by Likert (1903 – 1981), and *cite* Kidder and Judd (1986) who state that it is currently the most popular type of scale in the social sciences. Welman and Kruger (2001) state that the Likert scale may be used for multi-dimensional attitudes, which is not possible with other attitude scales. Saunders *et al.* (2003) state that rating or scale questions (where the Likert-style rating scale is one approach) are often used to collect opinion data.

Welman and Kruger (2001, p.150) note that a summated attitude scale consists of a collection of statements about the attitudinal object, and subjects have to indicate the degree to which they agree or disagree with each statement on, for example, a five-point scale such as strongly differ, differ, undecided, agree and strongly agree. According to these authors, an attitude scale should contain approximately the same number of positively and negatively formulated items to counteract acquiescent response cycle (i.e. where research participants tend to consistently answer yes to yes/no items or true to true/false items, irrespective of the content of the question). Mogey (1999) argues that a typical question using a Likert scale might pose a statement and ask the respondent whether they Strongly Agree, Agree, are Undecided, Disagree or Strongly Disagree. The responses obtained may be coded (e.g. 1 for 'Strongly Agree', 2 for 'Agree' and so on up to 5 for 'Strongly Disagree'), but this does not mean that a response of 'Agree' (coded as 2 points) and 'Undecided' (coded as 3 points) can be averaged to give two and a half points (Mogey, 1999). Instead, data collected are ordinal, that is, they have an inherent sequence, but it cannot be assumed that the respondent

means that the difference between ‘Agreeing’ and ‘Strongly Agreeing’ is the same as ‘Agreeing’ and ‘Undecided’ (Mogey, 1999).

Saunders *et al.* (2003) find that although a Likert scale may usually comprise a four, five, six or seven point rating scale, they *cite* Dillman (2000) who states that if the intention is to use a number of statements then the same order of response categories should be maintained to avoid confusing respondents. By using an even number of points, it is possible to exclude a neutral option on the scale such as ‘not sure’ and thereby force the respondent to express their feelings, (Saunders *et al*., 2003). A rating scale with an odd number of points allows for the inclusion of an option such as ‘not sure’ and thereby allows the respondent to ‘sit on the fence’, but has the advantage that it comes across as less threatening (as apposed to the respondent admitting they do not know) (Saunders *et al*., 2003). A Likert scale is often used in survey design in order to obtain meaningful quantitative answers to restricted or closed questions (Likert Scale, 2006).

Other rating scales include ‘numeric rating scales’ and ‘semantic differential rating scales’ (Saunders *et al*., 2003). In a numeric rating scale, a respondent is asked to rate their feelings on a scale between two extremes (e.g. poor value for money and good value for money), where there are no descriptions given for the points in between, but rather the respondent uses the number to express his feelings in response to the question, where for example the scale goes from one to ten (Saunders *et al*., 2003). The semantic differential rating scale is often used in consumer research to determine underlying attitudes (Saunders *et al*., 2003). Here, the respondent is asked to rate a single object or idea on a series of bipolar rating scales, where each bipolar scale is a pair of opposite adjectives (e.g. fast-slow, unfriendly-friendly, value for money-overpriced) (Saunders *et al*., 2003). Kervin (1999) *cited* by Saunders *et al.* (2003) states that when using the semantic differential rating scale, the position of positive and negative adjectives must be varied from left to right to reduce the tendency of respondents to read only the adjectives on the left.

Saunders *et al.* (2003) state that rating scales have been combined to measure a wide variety of concepts such as customer loyalty, service quality and job satisfaction, and for each concept, the resultant measure or scale is

represented by a scale score created by combining the scores for each of the rating questions.

4.4 Instrumentation

4.4.1 Tools for collecting primary data

Primary data can be gathered using a number of tools or techniques, such as observation, semi-structured interviews, in-depth interviews focus groups and questionnaires (Saunders *et al*., 2003). Participant observation is qualitative, involves the researcher participating fully in the lives and activities of subjects, and focuses on the meanings that people attach to their actions, while structured observation is quantitative, more detached and is more concerned with the frequency of those actions (Saunders *et al.*, 2003).

Semi-structured or unstructured interviews, in contrast to structured interviews (where questionnaires are used), are non-standardised (Saunders *et al.*, 2003). In semi-structured interviews the researcher will have a list of themes and questions to be covered, but these will vary from interview to interview depending on context, while unstructured interviews are informal and are used to explore in depth a general area of interest (hence also known as 'in-depth' interviews) (Saunders *et al*., 2003).

The table below illustrates the uses of the different types of interviews in each of the main research categories:

	Research Category		
Interview Type	**Exploratory**	**Descriptive**	**Explanatory**
Structured		YY	Y
Semi-structured	Y		YY
In-depth	YY		

Key: YY = Used more frequently, Y = Used less frequently

Table 4.2 Uses of different types of interviews in each of the main research categories (*Source*: Saunders *et al*., 2003)

Saunders *et al.* (2003) argue that each type of interview shown in the table has a different purpose, that is, structured or standardised interviews can be

used in survey research to gather data, which would then be the subject of quantitative analysis, while semi-structured and in-depth (or non-standardised) interviews are used in qualitative research in order to conduct discussions not only to reveal the 'what' and the 'how' by also to place more emphasis on exploring the 'why'. In the case of descriptive research studies, structured interviews (i.e. using questionnaires) can be used as a means to identify general patterns (Saunders *et al.*, 2003).

4.4.2 Questionnaires

According to Saunders *et al.* (2003) the greatest use of questionnaires is made by the survey strategy. Questionnaire based research has the advantage that because each respondent is asked to respond to the same set of questions, it provides an efficient way of collecting responses from a large sample (Saunders *et al.,* 2003). According to Robson (2002) *cited* by Saunders *et al.* (2003), questionnaires work best with standardised questions that the researcher is confident will be interpreted in the same way by all respondents.

Thus, according to Saunders *et al.* (2003), questionnaires can be used for descriptive or explanatory research, where descriptive research (such as that undertaken using attitude and opinion questionnaires) will enable the researcher to identify and describe the variability in different phenomena, while explanatory or analytical research will enable the researcher to examine and explain relationships between variables, in particular cause-and-effect relationships.

Questionnaires can be either of the self-administered type, or interviewer administered type (Saunders *et al.*, 2003). Self-administered questionnaires can be administered online, through the post or delivered to and collected from respondents, while interviewer administered questionnaires can take the form of either telephonic questionnaires or structured interviews (Saunders *et al.*, 2003). The choice amongst these types of questionnaires will depend on a variety of factors related to the research question(s) and objective(s) (Saunders *et al.*, 2003). These factors, according to Saunders *et al.* (2003) include: (1) characteristics of the respondents from whom one wishes to

collect data; (2) importance of reaching a particular person as respondent; (3) importance of the respondents' answers not being contaminated or distorted; (4) size of sample one requires for the analysis, taking into account the likely response rate; and (5) types of questions one needs to ask to collect the data.

Furthermore, the choice of questionnaire will be affected by the resources the researcher has available, and in particular (1) time available to complete the data collection; (2) financial implications of the data collection and entry; (3) availability of interviewers and field workers to assist; and (4) ease of automating data entry. The researcher will use closed ended questions supported by the opportunity to explain the motivation why a specific answer was selected.

4.4.3 Types of variable

Dillman (2000) *cited* by Saunders *et al.* (2003), distinguishes between three types of variable that can be collected through questionnaires, namely (1) opinion; (2) behaviour; and (3) attribute. Opinion variables record how respondents feel about something or what they think or believe is true or false (Saunders *et al.*, 2003). When recording what respondents do, behaviour is being recorded and behavioural variables contain data on what people did in the past, are doing at present, or will do in future (Saunders *et al.*, 2003).

Attribute variables, in contrast to opinion and behaviour variables, record characteristics of respondents (Saunders *et al.*, 2003), where attributes are best thought of as things a respondent possesses, rather than what a respondent does (Dillman, 2000 *cited* by Saunders *et al.*, 2003). According to Saunders *et al.* (2003) attribute variables are used to explore how opinions and behaviour differ between respondents as well as to check that the data collected are representative of the total population, and examples include variables such as age, gender, marital status, education, occupation and income.

4.4.4 Choice of data collection tool

Since this research study aims answer the research questions developed in Chapter 3 by surveying the attitudes of students and staff on UNISA's IS as

well as to uncover the social impact the of UNISA's IS on the social community within the institution (this research is descriptive and explanatory in nature), the questionnaire has been chosen as the data-gathering tool, based on the discussion presented above. This will allow the collection of quantifiable data and allow for the quantitative analysis of this data to determine patterns and relationships.

4.5 Types of questions

According to Saunders *et al.* (2003), most types of questionnaires make use of a combination of open and closed questions. Open questions allow respondents to give answers in their own way (Fink, 1995a; *cited* by Saunders *et al.*, 2003). Open questions are sometimes referred to as 'open-ended' questions (Dillman, 2000; Saunders *et al.*, 2003). On the other hand, closed questions provide a number of alternatives from which the respondent is instructed to choose. Closed questions are also sometimes referred to as 'closed-ended' questions (Dillman, 2000; *cited* by Saunders *et al.*, 2003) or 'forced-choice' questions (deVaus, 2002; *cited* by Saunders *et al.*, 2003).

Saunders *et al.* (2003) *cite* Youngman (1996) who identifies six types of closed questions, namely (1) 'list', where the respondent is offered a list of items, any of which may be selected; (2) 'category', where only one response can be selected from a given set of categories; (3) 'ranking', where the respondent is asked to place something in order; (4) 'scale or rating', in which a rating device is used to record responses; (5) 'quantity', to which the response is a number giving the amount; and (6) 'grid', where responses to two or more questions can be recorded using the same matrix. The Likert Scale (discussed earlier) can be used for the fourth type of closed question given above (Saunders *et al.*, 2003). Closed ended questions will be used.

4.5.1 Developing the questionnaire

Research questions can be considered as critical questions which are based on the research problems under investigation. The following are details of the research questions that formed the bases of this study and were used to

formulate the research tool, the questionnaire (see Appendix A). The different questions of the questionnaire are specified under the research question/s that was used to formulate them:

1. What is the impact of UNISA IS within the institution?
    - Questions 1 – 6 and 23 – 26 in the questionnaire (Appendix A)
2. In what ways does the social relationships of users during system development/or planning impact on IS?
    - Questions 18 – 20 and 23 – 26 in the questionnaire (Appendix A)
3. To what degree are the users of UNISA IS involved and participate in the development and/or planning of these systems?
    - Questions 7 – 17 in the questionnaire (Appendix A)
4. How does user involvement and participation relate to IS success?
    - Questions 7 – 17, 21 – 22 and 27 in the questionnaire (Appendix A)
5. What social factors influence the development and/or planning of IS?
    - Questions 1 – 6 and 23 – 26 in the questionnaire (Appendix A)

4.5.2 Questionnaire validation and finalisation

The questionnaire was tested by sending it to two friends and one academic personnel to read it and if their understanding is same of the researcher. This is called piloting. Piloting of a questionnaire refers to sending the questionnaire out to few people who do not form part of the research population, to respond to the questions in the initial draft. The aim is to determine if the responses show that the questions convey the meanings as required, and then to fine tune the questionnaire to be able to present the questions as intended (Putnam, 1999). This study followed that route as well. Firstly, the initial questionnaire draft was piloted among eight people consisting of seven colleagues and one friend. Responses and validation would then lead to the finalisation of the questionnaire. The researcher did not

recommend any changes to the questionnaire. The university has no Ethics committee or it is not necessary for the questionnaire to go through the Ethics committee because the study supervisor approves the questionnaire.

4.5.3 Actual questionnaire for distribution

After receiving the responses and feedback from the pilot group, the questionnaire was updated. After discussing the second draft with the supervisor the questionnaire was finalised. The final questionnaire was then discussed with the supervisor. It was circulated through e-Mail to the targeted population after necessary approvals from the Supervisor.

4.6 Population and sample size

The study population refers to the entire group of people or items that would be available to provide the responses required in the study (Chia, 1995: 580; Eden & Huxham, 1996: 79; Hassard, 1991; Putnam, 1999). In some cases the population is so large that it cannot be used due to inability of a researcher to handle it. In such a case some subset of the population is used for the study. Such a subset used for the study is called a sample (Crombie & Davies, 1996: 88).

Initially, the entire UNISA staff and students served as possible elements that might be included in the research sample. However, the study focused more on those that could provide responses. The population consists of both academics and students who use the system for information. For classification purposes they will all be regarded as the same user for this study. A sample frame is a subpopulation that the research uses for reasons of feasibility to effect a study (Daymon & Holloway, 2002: 157; Grubbs, 2001; Haslam & McGarthy, 2003: 110). In this study that subpopulation, or sample frame, consisted of staff and students who were around Pretoria during the time of the study. The research sample was selected from the sample frame. A sample of size 384 was selected for the results to be statistically significant.

The population consists of both academics and students who use the systems for information. For classification purposes they will all be regarded as the same user for this study. The sample consists of users of myUNISA, EDS and

Osprey, which are the UNISA's principal IS. The sample size was 384, which was the required size according to Krejcie and Morgan (1970) for the results to be statistically significant.

4.7 Data handling

No permission is required to run the survey. The questionnaire was administered through e-Mail. According to Witmer *et al.* (1999) *cited* by Saunders *et al.* (2003), e-Mail offers greater control as to who answers the questionnaire because most users read and respond to their own mail at their personal computer. Data analysis was done through Excel. A few minor consultations were made with statisticians in the University's Department of Statistics and the South African Revenue Services.

4.8 Conclusion

In this section the types of data in research were discussed, the Likert Scale, the method of data collection chosen (i.e. questionnaires), types of questions that were asked and development of the questionnaire, steps taken to validate the questionnaire, the survey population and sample size determination and data handling.

The research instrument that was used to collect primary data was in the form of a questionnaire. Questionnaire based research has the advantage that because each respondent is asked to respond to the same set of questions, provides an efficient way of collecting responses from a large sample (Saunders *et al.,* 2003). This choice was made because of the resources available to the researcher in particular the time available to complete the data collection.

Since this research study aims answer the research questions developed in Chapter 3 by surveying the attitudes of students and staff on UNISA's IT as well as to uncover the social impact the of UNISA's IT on the social community within the institution (this research is descriptive and explanatory in nature), the questionnaire will allow the collection of quantifiable data and

allow for the quantitative analysis of this data to determine patterns and relationships.

The next chapter is data analysis and interpretation chapter. It will present and discuss the demographic profile of each question; the results of the questions aimed specifically at answering the research questions will be discussed. Where necessary, the required statistical analysis will be undertaken to investigate possible relationships between variables.

CHAPTER 5

DATA ANALYSIS AND INTERPRETATION

5.1 Introduction

Social Informatics is deeply concerned with the context in which each new technology appears (Kling, 2000). The main idea behind Social Informatics research is that ICTs do not exist in social or technological isolation (Kling, 2000). One key idea of social informatics research is that the social context of information technology development and use plays a significant role in influencing the ways in which people use information and technologies, and thus affects the consequences of the technology for work, organisations and other social relationships. This study's context is in the field of Social Informatics.

The main aim of the research was to establish the level of Social Impact of IS at UNISA. The problem is that users of UNISA's IS were not involved in the development and/or planning of these systems. The research questions addressed various aspects of involvement of users during systems development and planning (Section 3.9).

Social issues permeate any technology, including its origin, its use, and its demise (University of California, 2003). According to Kling (2000) the social impact of an IS are the users. Users play role in the success of an IS, but the social implications that affect them are not fully accounted for by system designers and those implementing the system. In the Extreme Chaos Study (2001) it was found that in the year 2000, lack of user involvement was noted as the number one cause of project failure.

This chapter will present and discuss the demographic profile of each question. The results of the questions aimed specifically at answering the research questions will be discussed. Topics to be discussed in this section

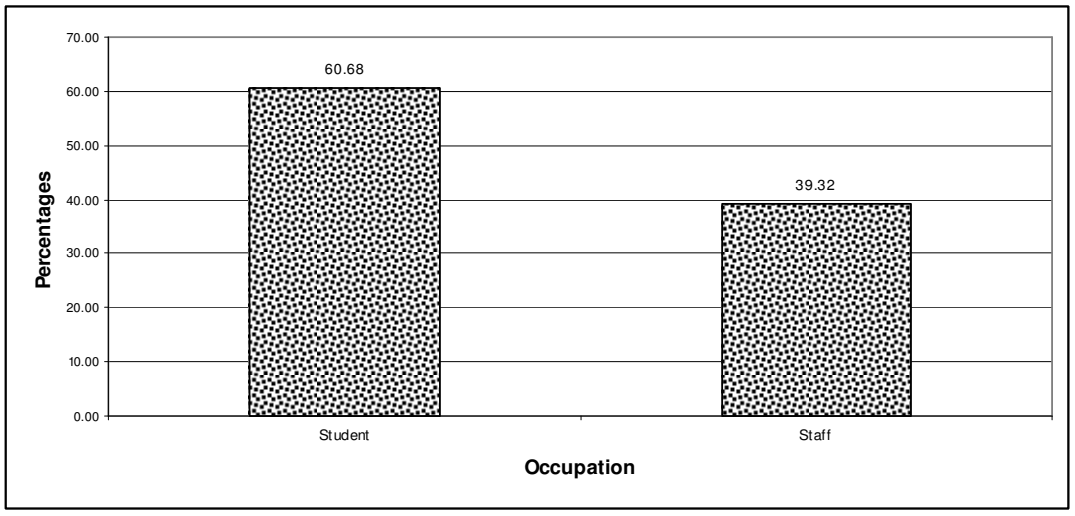
are the following respondents' profiles, Awareness and satisfaction with UNISA's IS, Involvement and Participation in Developing Systems, Use and Satisfaction with UNISA's Systems, Option Used and the conclusion of the chapter.

5.2 Respondents Profiles

A total of 384 respondents answered the questionnaire. Some respondents were also temporary or permanent staff members of UNISA.

5.2.1 Occupation

Figure 5.1: Occupation



The display above shows that the respondents consisted of 233 (60.7%) respondents that are only students and 151 (39.3%) who are also temporary or permanent staff members of the university. The respondents were all given an equal chance to be included in the study. The researcher went to the library and guided them how to fill the questionnaire.

5.2.2 Age group in years

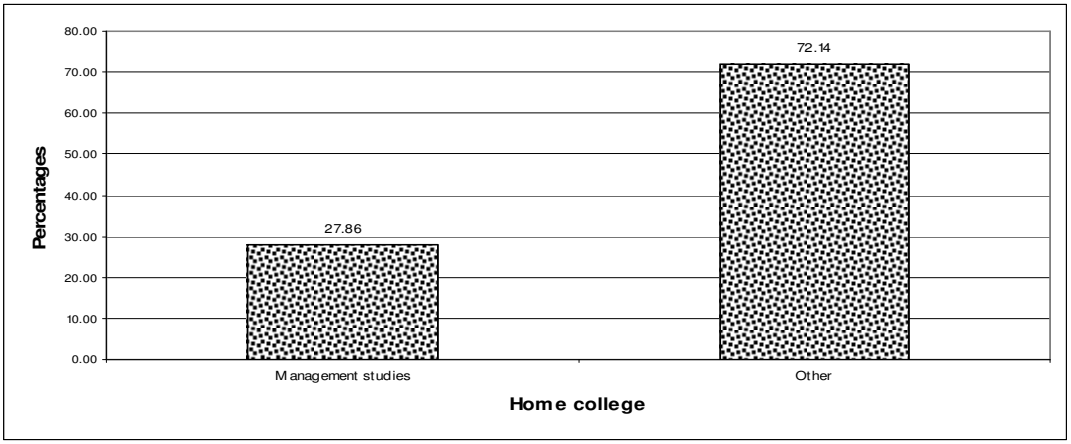
Table 5.1: Ages

Ages	18 - 24	25 - 34	35 - 44	45 - 59	> 60
Frequencies	101	151	101	25	6
Percentages	26.30	39.32	26.30	6.51	1.56

Table 5.1 indicates that 39.3% of the respondents are between the ages 25 and 34; the reason might be that they preferred to work first to pay their own study fees. The ages between 18 and 24 are 26.3% of the respondents and are those whose parents can afford the tuition fees, and also who were able to secure study loans and bursaries. Between the ages of 35 and 44 which make 26.3 % of the respondents are people who might already occupying higher positions in their jobs and want to enhance their knowledge and also to capacitate themselves in their daily challenges.

5.2.3 College you are in

Figure 5.2: Home College

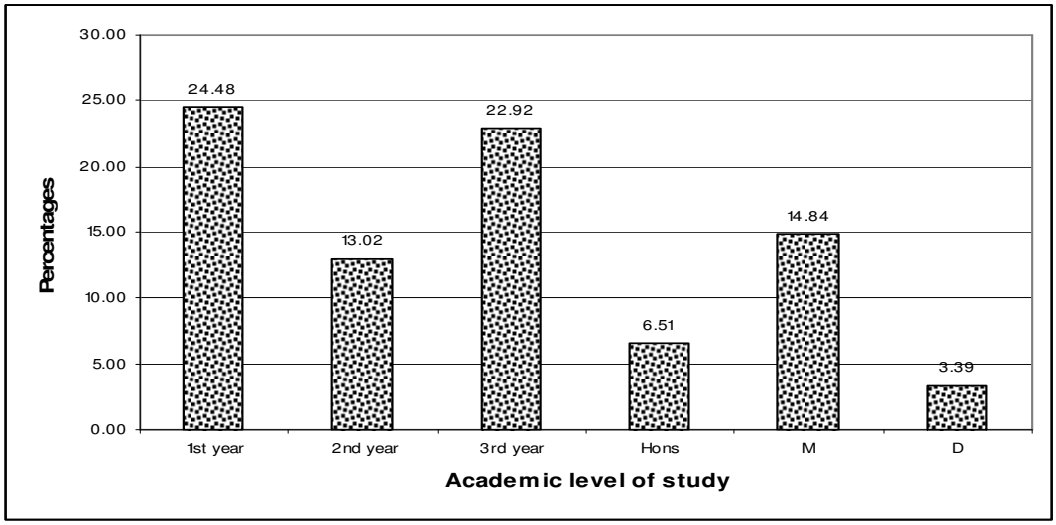


The Figure above shows that there were 107 (27.9%) respondents from Management studies and 277 (72.1%) from other colleges. It supports the fact that the College of Economic and Management Studies is the college with the largest number of student registrations at UNISA.

5.2.4 If student, year of study

In this question it was expected that 384 would respond. However, there were 57 respondents who were both staff and students and preferred to identify them as staff firstly. Hence, a total of 327 people responded.

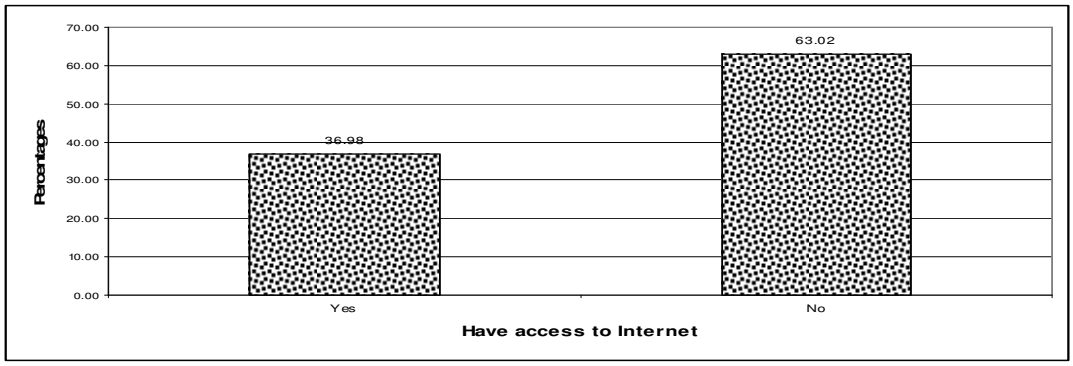
Figure 5.3: Level of Study



The question wanted the distributions of the respondents who responded in terms of their levels of study. Figure 5.4 shows that there were 94 (24.5%) first years, 50 (13.0%) second years, 88 (22.9%) third years, 25 (6.5%) honours, 57 (14.8%) master and 13 (3.4%) doctoral students. This shows that the sample included every level of study the university offers; hence the sample is representative in terms of level of study.

5.2.5 Have Internet access at residence

Figure 5.4: Access to Internet



The question wanted to determine if respondents can really use the UNISA systems.

5.3 Awareness and Satisfaction with UNISA' IS

5.3.1 Primary Internet access method

Some respondents used more than one Internet access method. Hence, the sum total of frequencies reflects a higher total than 384.

Figure 5.5: Primary Internet access

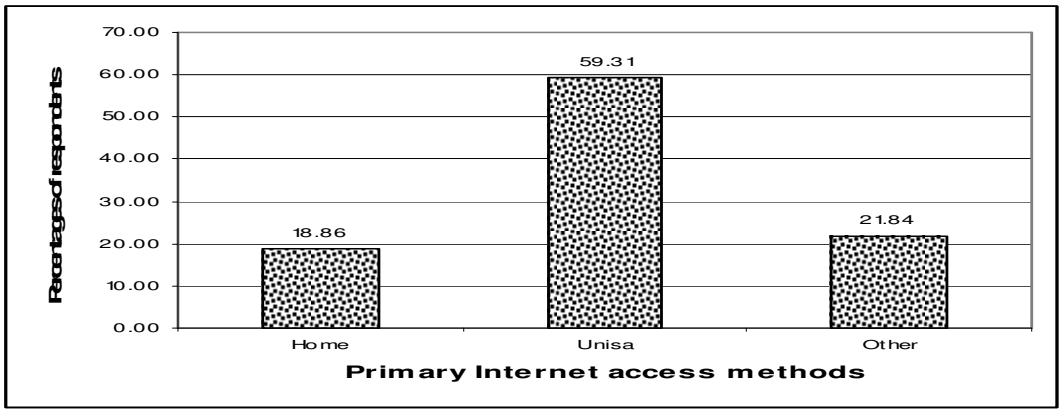


Figure 5.5 show that UNISA provides primary means of accessing the internet to its students. The study indicates that 76 (18.9%) respondents had Internet access in their homes; 239 (59.3%) accessed the Internet at UNISA while 88 (21.8%) used other means of Internet access.

5.3.2 IS you are aware of

Regarding this question as well, some respondents were aware of more than one IS. As a result, the total of frequencies also reflects a higher total than 384.

Table 5.2: Awareness about IS

Information System	UNISA Website	myUNISA	Osprey	EDS	Student system	E-mail
Awareness	246	302	69	88	113	238
Percentages	23.30	28.60	6.53	8.33	10.70	22.54

Most respondents know about myUNISA (303) and little less about the UNISA website (246) and e-Mail (238). All the respondents should know about myUNISA, website and e-Mail because it is advertised in all study letters and used to deliver study material to the students. Few knew about Osprey and EDS because they are subject related and not many of the respondents study the courses. Respondents who know about Student System are probably those students who are also temporarily or permanently employed by UNISA, because this system is not accessible to students.

5.3.2.1 Comparing level of awareness of the IS

A chi-square test is performed to determine if some IS were known by the respondents more than others. If there is no higher awareness for some, then identical awareness implies equal probability of awareness of the different IS. Hence, the chi-square test of hypothesis should have the null hypothesis $p = \frac{1}{6}$. Again, the statistical test is as follows:

$$H_0: \ p = \frac{1}{6} \qquad \text{vs. } H_1: \ p = \frac{1}{6}$$

The test statistic is:

$$\chi^2 = \sum \frac{(O - E)^2}{E}$$

where

Table 5.3: Chi- square test on IS awareness

Information System	UNISA Website	myUNISA	Osprey	EDS	Student system	E-mail	Total (N)
O	246	302	69	88	113	238	1056
E	176	176	176	176	176	176	

with O = observed frequencies and $E = Np = 1056\left(\frac{1}{6}\right) = 176$

Thus,

$$\chi^2 = \sum \frac{(O-E)^2}{E} = \frac{(246-176)^2}{176} + \ldots + \frac{(238-176)^2}{176} = 271.4886$$

Using the 5% significance level the critical region is

$$\{\chi^2 > 11.07\}$$

Since the calculated values of $\chi^2 = 271.4886$ falls in the rejection region, the suggestion that the respondents had equal awareness for all the IS cannot be accepted. Therefore, it can be concluded that some IS at UNISA were known more than others.

5.3.3 IS option you used

This was another question where overlaps occurred. Some respondents used more than one IS. Thus, the total of frequencies obtained also reflects a higher total than 384.

Figure 5.6: IS Option Used

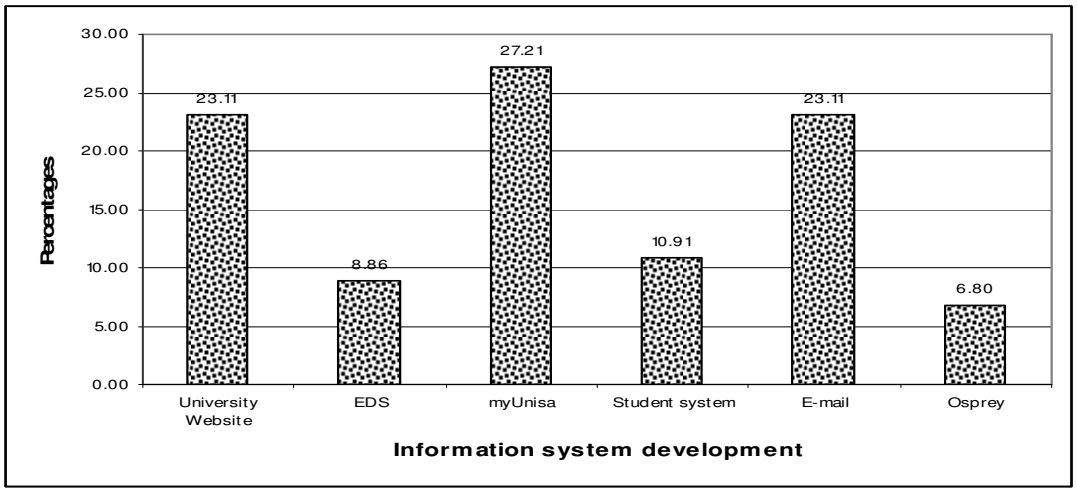


Figure 5.6 shows IS usage. It was noted that a limited number of people are using myUNISA since this is the primary method of delivering study material. This is in agreement with Amory (2003). The large number is also assessing

UNISA website and is important since it means that they are using the site to search for information.

Correlation between awareness and use of an IS

Assuming that extent of awareness can be used to predict level of use, defined Y = level of use and X = awareness which resulted:

Table 5.4: Correlation on awareness and IS Usage

X	246	302	69	88	113	238
Y	214	252	63	82	101	214

The Excel output yields:

	X	Y
X	1	
Y	0.9981	1

It is clear that there exists a statistically significant, strong, positive correlation between the two variables ($r = 0.9981$, $n = 384$, $p < 0.05$) the more one is aware of the system the more one will tend to use the system. This relationship is excellent, and the regression linear equation resulting from the relationship can be used with 97% accuracy of results.

Comparing the level of use of the IS

A chi-square test is performed to determine if some IS were used by the respondents more than others. If there is no higher use of some IS than other, indistinguishable awareness implies that there are equal probabilities of use of the different IS (Hill, 1999). Hence, the chi-square test of hypothesis should have the null hypothesis $p = \frac{1}{6}$.

Again, the statistical test is as follows:

H_0: $p = \frac{1}{6}$ vs. H_1: $p = \frac{1}{6}$

The test statistic is:

$$\chi^2 = \sum \frac{(O-E)^2}{E}$$

where

Table 5.5: Chi-square on IS usage Comparison

Information System	UNISA Website	EDS	myUNISA	Student system	E-mail	Osprey	Total (N)
O	214	82	252	101	214	63	926
E	153.33	153.33	153.33	153.33	153.33	153.33	

with O = observed frequencies and $E = Np = 926\left(\frac{1}{6}\right) = 176$

Thus,

$$\chi^2 = \sum \frac{(O-E)^2}{E} = \frac{(214-153.33)^2}{153.33} + \ldots + \frac{(63-153.33)^2}{153.33} = 214.324$$

Using the 5% significance level the critical region is

$$\{\chi^2 > 11.07\}$$

Since the calculated values of $\chi^2 = 214.324$ falls in the rejection region, the suggestion that the respondents use the different IS equally cannot be accepted.

The general perception is that students and staff should be using the systems at UNISA but the hypothesis proves the opposite. This is something that must be improved upon.

5.3.4 Satisfaction with UNISA IS

On this question the respondents were requested to state if they were satisfied with the IS they used. They had to report the level of satisfaction or dissatisfaction on each IS they were using. Since the total number of respondents was affected by overlapping, this is inherited here. The extent of satisfaction or dissatisfaction was also required.

Table 5.6: Level of Satisfaction with System

Satisfaction level	Completely satisfied	Reasonably satisfied	Not satisfied	Completely unsatisfied
Frequencies	145	233	6	0
Percentages	37.76	60.68	1.56	0

Only six respondents indicated they were not happy with the systems available to them. This could be interpreted that the respondents are happy with the systems even though they were not involved. These results indicate that UNISA IS is reasonably successful as only 1.56% of users were not satisfied with the systems available to them.

5.3.5 Overall perception of UNISA's IS quality

The respondents were requested to make their own judgment on the quality of the IS they used. They had to report whether they found it to be excellent, good, acceptable or poor. Again, the total number of respondents was affected by overlapping.

Figure 5.7: Perception about System's Quality

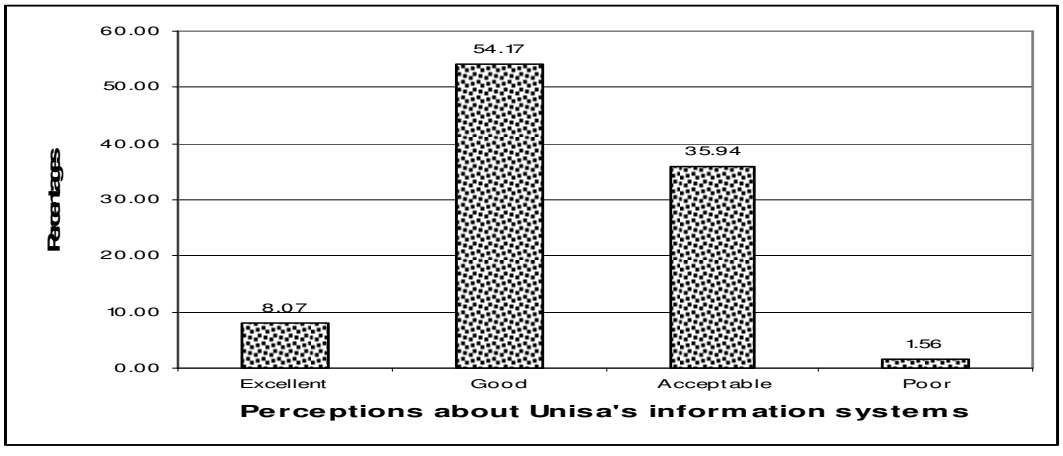


Figure 5.7 shows that majority of respondents perceive UNISA IS of good quality, the reason might be that students are able to access the information required of them.

Correlation between satisfaction level and perceived quality

Assuming that perceived quality can be used to predict satisfaction level, defined Y = satisfaction level and X = perceived quality, which resulted:

Table 5.7: Correlation between satisfaction level and perceived quality

X	31	208	138	6
Y	145	233	6	0

The Excel output yields:

Table 5.8: Excel output

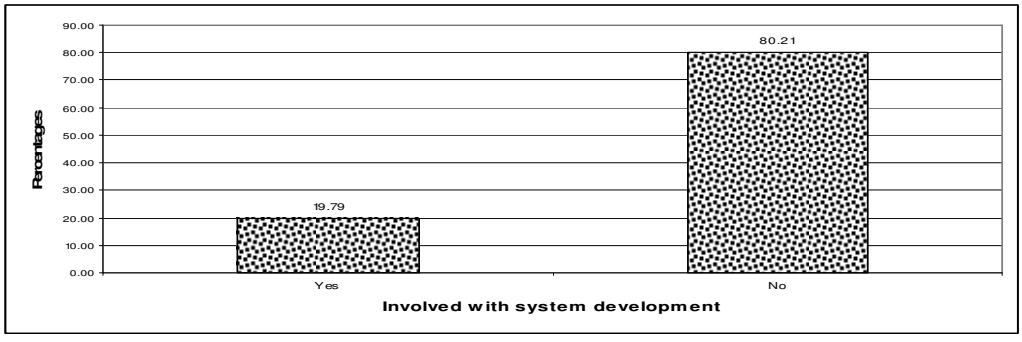
	X	Y
X	1	
Y	0.531587	1

There exists a statistically significant positive correlation between perceived quality of a system and the satisfaction level from the system ($r = 0.5316$, $n = 384$, $p < 0.05$). This might mean that the more students use the system, the quality of the system become more evident to them.

5.4 Involvement and Participation in Developing Systems

5.4.1 Involvement with UNISA Information System development

Figure 5.8: Involvement with System Development



According to Barki and Hartwick (1989) in the literature reviewed, user involvement must be further divided into user participation and user involvement. User participation refers to the actual physical involvement of the users in the development and/or implementation of the Information System, whereas user involvement refers to the subjective psychological state reflecting the importance and personal relevance of a system to the user.

Barki and Hartwick (1989) in the research literature also reveal one theme has been prominent, which is the fact that user involvement and participation in the development and/or implementation of a successful Information System is vital. Over 80 % of respondents did not participate at all in the development and/or implementation of any of the specified UNISA IS. This indicates that there was a forced acceptance as the users have no choice but to use UNISA's IS.

5.4.2 If involved with system development, which one?

This question wanted the 76 respondents who indicated that they were involved in the development of the IS to indicate the specific system in which they were involved.

Table 5.9: Involvement with Specific System Development

System development	UNISA Website	EDS	Osprey	myUNISA	E-mail	Student system
Frequencies	3	0	2	71	0	0
Percentages	3.95	0.00	2.63	93.42	0.00	0.00

The respondents were involved only in the UNISA website, Osprey and myUNISA and no one was involved in EDS, email and the student system. Table 5.9 shows the extent of involvement as three (4.0%) respondents having participated in the development of the UNISA website, two (2.6%) having participated in the development of Osprey and 71 (93.4%) having participated in the development of myUNISA. This also supports the fact that systems were 'forced' on users.

5.4.3 Needs considered during development and/or planning

The question wanted to determine if the respondents felt that their various needs for the work at UNISA were considered when the IS were developed and implemented.

Table 5.10: Were your needs considered

Needs considered	Yes	No	No response
Frequencies	214	145	25
Percentages	55.73	37.76	6.51

Table 5.10 shows that 214 (66.7%) respondents believed that their needs were taken into account in the development and/or implementation of the UNISA's IS. The reason for the unexpected student response could be that the students themselves do not fully understand their own needs.

5.4.4 Asked what you wanted in systems

The question wanted the respondents to indicate if they were consulted about what they wanted/needed in the IS they were to use while working or studying at UNISA. This is in accordance with Clow (1999) that feedback on users of systems is important, if the IS is to be successful.

Table 5.11: Were you asked if you required the system

You were asked	Yes	No	No response
Frequencies	94	277	13
Percentages	24.48	72.14	3.39

Table 5.11 showed that that 94 (24.5%) respondents indicated that they were consulted regarding what they needed in an IS for their work at UNISA, 277 (72.1%) indicated that they were not consulted and 13 (3.4%) did not tell whether they were consulted or not. These results are almost paradoxical, as fewer students were asked if they wanted or what they wanted from the system, but most students feel that their needs have been taken into account as indicated in Table 5.11. The reason might be that best practices in terms of

learning techniques and methods were applied in the development of these systems.

5.4.5 Willingness to be involved in systems development

The question wanted the respondents to indicate if they were willing to be involved in the development of the IS used for studies and work at UNISA.

Table 5.12: You are willing to develop system

You are willing	Yes	No	No response
Frequencies	327	50	7
Percentages	85.16	13.02	1.82

Mckeen, *et al* (1994) in literature reviewed, stated that it is important to note the difference between voluntary versus forced acceptance. It goes to say that users involvement does not affect acceptance if there is forced acceptance, as the user has no choice but to use the IS, whereas users involvement does affect user acceptance if the acceptance is voluntary. Therefore it is necessary to have positive user involvement when acceptance of an IS is left up to the user. Users' involvement in the development and implementation of these IS, can be described as their willingness to participate in the development and improvement of the university's IS, and users view on the effect of their input on the quality of those systems (Mckeen *et al.,* 1994).

The results reveals that 85% of users said that they would be willing to participate in the development of UNISA IS that are built for them, The remaining 13% and 1.8% of users are not willing to participate in development; these respondents represent users that have a negative involvement in the development of UNISA IS and are hindrances to successful development and/or implementation of those systems (Hall, 2006). Hall (2006) further argued that those users, who would not be willing to participate in the development, may do so because of the time and effort that would need to be expended or because they do not want to use and/or do not support the implementation of the proposed IS.

5.4.6 Willingness to be involved in systems improvement

Table 5.13: You are willing to improve system

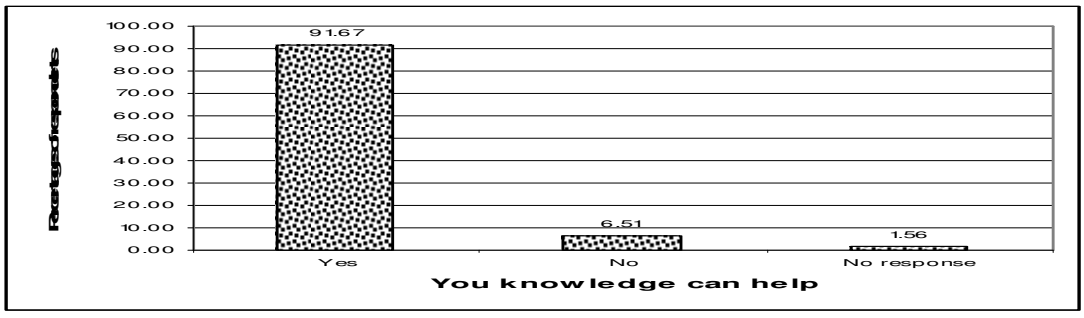
You are willing	Yes	No	No response
Frequencies	340	38	6
Percentages	88.54	9.90	1.56

The results also reveal that 88.54% of respondents would be willing to participate in the improvement of these systems. The remaining 11.46% represents users with a negative involvement. It shows UNISAs' community of users are willing to take ownership of the systems available for their use, hence the quality of the system might improve also if their views are taken into account by developers and implementers. This is in accordance with Kling (1999).

5.4.7 Feeling that your opinion/knowledge could help

This question wanted to determine if the respondents had confidence that their knowledge and/or opinions could be useful in improving the quality of the IS used in UNISA.

Figure 5.9: Your knowledge can help



Another determining factor of user involvement is how valuable a user views their input into the development or implementation of IS built for them. The results in Figure 5.9 show that 352 (91.7%) users feel that their input/participation will or would have improved UNISA' IS.

5.5 Use and Satisfaction with UNISA's Systems

5.5.1 Rate of use in UNISA courses

In this question the respondents were requested to indicate their extent of use and satisfaction regarding the three UNISA's Systems below.

Figure 5.10: Rate of Use

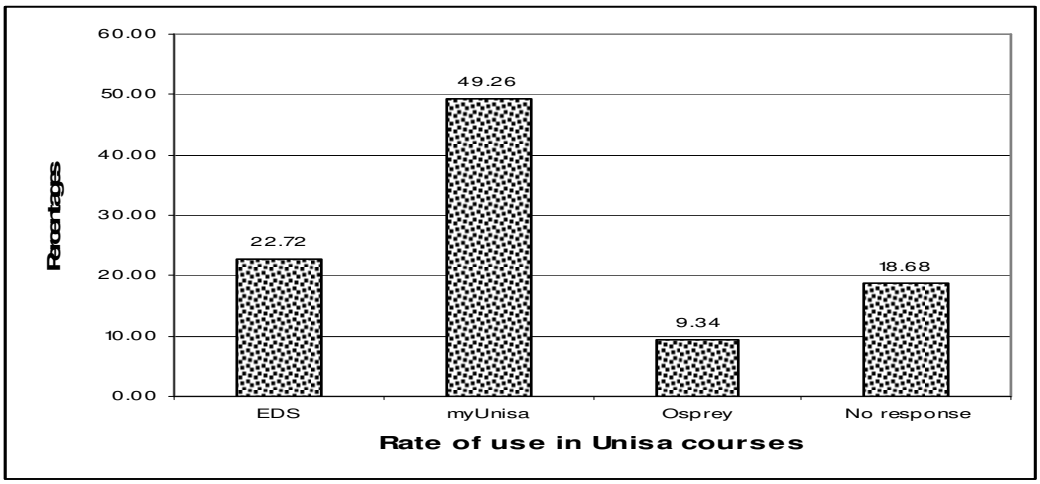


Figure 5.10 show that a higher percentage of respondents use myUNISA more often. This rate of use is logical because it is the system that is mainly advertised by the university, study material is delivered through this system also assignments are submitted through this system and tutorial letters are posted on this system by academic for students to access. This is in accordance with Yusuf (2005) that ICT provides access to more extensive and current information. EDS access rate is little lower and Osprey is much lower because these systems are course specific and students using this systems still have to use myUNISA at some stage.

5.5.2 Frequency of accessing

Table 5.14: Frequencies of Accessing

	EDS	myUNISA	Osprey
At least once per day	50	82	57
At least once per week	31	157	13
At least once per month	6	88	38
Never	38	13	44

It is clear from Table 5.14 that myUNISA is the system that was accessed more often than the other systems. This system was accessed most frequently "at least once a week" compared to other frequencies. Also, myUNISA is the system with the least rate for the systems that was never accessed. The reason is that myUNISA is primary to the distance learning mode of UNISA and should always be accessed by students for students to remain current. Only 2.11% of the respondents never accessed myUNISA. This is according to Yusuf (2005) that IS enhance learning.

EDS and Osprey were accessed much less frequently than myUNISA. On their own they were accessed most frequently in the at least once a day frequency. Osprey was accessed least in the "at least once a week" rate while EDS was least at "at least once a month" rate. These two systems are course specific and the number of registrations is less.

5.5.2.1 ANOVA for testing frequencies of access and IS

ANOVA is a technique for comparing sample means; but unlike the t- test, it can be used to compare more than two means. With ANOVA, because several sample means are usually being compared, once a null hypothesis has been rejected we need a follow-on, or post hoc, procedure. It is possible that some pairs of means may not be significantly different from one another. Thus the process is a bit like aerial photography. ANOVA gives a high-altitude picture, and the null hypothesis can be rejected.

Table 5.15: Frequencies of access and IS

	EDS	myUNISA	Osprey
At least once per day	50	82	57
At least once per week	31	157	13
At least once per month	6	88	38
Never	38	13	44

Hypotheses being tested are:

H_{or}: There are no differences in yield according to frequency of access

H_{oc}: There are no differences in yield according to IS accessed

The subscript 'r' refers to rows, which is about the effect of the frequencies of access.

On the other hand, the subscript 'c' refers to columns, which is about the effect of the type of IS.

The ANOVA output is:

Table 5.16 :ANOVA: Two-Factor Without Replication

SUMMARY	*Count*	*Sum*	*Average*	*Variance*
At least once per day	3	189	63	283
At least once per week	3	201	67	6156
At least once per month	3	132	44	1708
Never	3	95	31.66667	270.3333
EDS	4	125	31.25	344.9167
myUNISA	4	340	85	3462
Osprey	4	152	38	340.6667

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Rows	2466.25	3	822.0833	0.494412	0.699261	4.757055
Columns	6858.167	2	3429.083	2.062296	0.208123	5.143249
Error	9976.5	6	1662.75			
Total	19300.92	11				

The results are not significant for both rows and columns. It can be concluded that there is no evidence against the hypotheses that the yield is not affected by the type of IS used or by the frequency of accessing an IS. The null hypothesis is rejected.

5.5.2.2 Dependency of frequency of access on the kind of IS

A chi-square test is performed to determine if that dependence is not there, then independence would mean that (row total)×(row total)/(grand total) would be close to the observed values. In this case the statistical hypotheses are:

H_0: Frequencies of access and IS types are independent

vs.

H_a: The said variables are dependent

The test statistic is:

$$\chi^2 = \sum \frac{(O-E)^2}{E}$$

where

Table 5.17: Frequency of access on the kind of IS

O	EDS	myUNISA	Osprey	**Row totals**
At least once per day	50	82	57	**189**
At least once per week	31	157	13	**201**
At least once per month	6	88	38	**132**
Never	38	13	44	**95**
Column totals	**125**	**340**	**152**	***617***

Table 5.18: Expected Frequencies

E	EDS	myUNISA	Osprey
At least once per day	38.29	104.15	46.56
At least once per week	40.72	110.76	49.52
At least once per month	26.74	72.74	32.52
Never	19.25	52.35	23.40

with O = observed frequencies and

$$E = \frac{C_i T}{T_j}$$

Thus,

$$\chi^2 = \sum \frac{(O-E)^2}{E} = \frac{(50-38.29)^2}{38.29} + \ldots + \frac{(44-23.40)^2}{23.40} = 145.3774$$

Using the 5% significance level, df = (3 – 1)(4 – 1) = 6, the critical region is

$$\{\chi^2 > 12.59\}$$

Since the calculated values of $\chi^2 = 145.3374$ falls in the rejection region, the suggestion that the frequency of accessing and IS is independent of the kind of the system cannot be accepted. Thus, it can be concluded that the frequency of accessing an IS depends on the kind of system.

Figure 5.11: IS use on Various Tasks

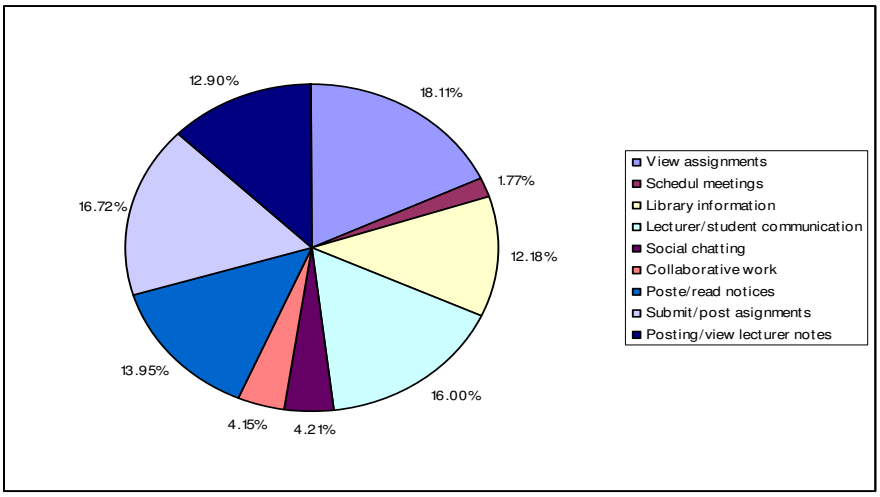


Figure 5.11 show that viewing of assignment is the most popular task used with the systems (18.1% of the time) in the systems; followed by submitting/posting assignments (16.7%); which is closely followed by communication between students and lecturer (16.0%). It is logical because the tasked indicated are the most common in distance learning environment (Yusuf, 2005).

Other significant uses, from highest to lowest, are posting/reading notices (14.0%); posting/viewing lecturers' notes (12.9%); and library information (12.2%). Minor tasks, also from highest to lowest, are social chatting (4.2+%), collaborative work (4.2%) and scheduling of meetings (1.8%).

5.5.2.3 Comparing the level of use of the IS on various tasks

A chi-square test is performed to determine if some IS were used by the respondents on certain tasks more than in other tasks. If there is no higher use of some IS than other, indistinguishable awareness implies that there are equal probabilities of use of the different IS. Hence, the chi-square test of hypothesis should have the null hypothesis given by $p = \frac{1}{9}$.

Again, the statistical test is as follows:

H_0: $p = \frac{1}{9}$ vs. H_1: $p \neq \frac{1}{9}$

The test statistic is:

$$\chi^2 = \sum \frac{(O-E)^2}{E}$$

where

Table 5.19: Level of use of IS on various tasks

	O	E
View assignments	327	200.67
Schedule meetings	32	200.67
Library information	220	200.67
Lecturer/student communication	289	200.67
Social chatting	76	200.67
Collaborative work	75	200.67
Post/read notices	252	200.67
Submit/post assignments	302	200.67
Posting/view lecturer notes	233	200.67
Total	**1806**	

with O = observed frequencies and $E = Np = 1806\left(\frac{1}{9}\right) = 200.67$

Thus,

$$\chi^2 = \sum \frac{(O-E)^2}{E} = \frac{(327-200.67)^2}{200.67} + \ldots + \frac{(233-200.67)^2}{200.67} = 487.7143$$

Using the 5% significance level, df = 9 -1 =8, the critical region is

$$\{\chi^2 > 15.51\}$$

Since the calculated values of $\chi^2 = 487.7143$ falls in the rejection region, the suggestion that the different IS are used equally on the specific tasks listed cannot be accepted. Thus, it can be concluded that the respondents were using IS in some tasks more than in other tasks.

5.5.3 Miscellaneous use of system

Figure 5.12: Percentages of use of Systems on specific tasks

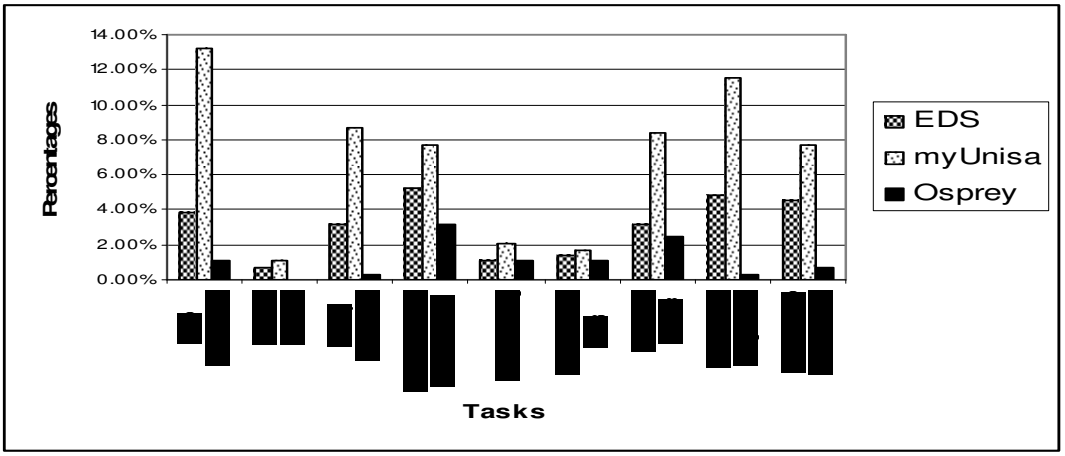


Figure 5.12 show that myUNISA is the system used most often for all the tasks, even though it differs in extent of use for the various tasks. Viewing assignments, submitting/posting assignments, library information, posting/reading notices, posting/viewing lecturer notes and lecturer/student communication, in the order from highest to lowest, are the most significant tasks for which myUNISA is used. These tasks are also higher than the highest rates of use of all significant uses of EDS and Osprey. This results are logical because the primary purpose of myUNISA was to facilitate the tasks as indicated and all students should be using myUNISA to do exactly those tasks. This is in agreement with Yusuf (2005) that IS has impacted on how teaching and learning is delivered in traditional and distance institutions.

The Figure 5.12 also shows that EDS is used more than Osprey. The most significant uses of EDS, from highest to lowest, are lecturer/student communication; submit/post assignment; post/view lecturer notes; view assignments; post/read notices; and library information. This results shows that myUNISA is a popular Information System at UNISA.

The most significant uses of Osprey, from highest to lowest, are lecture/student communication; and post/read notices. The reason is that Osprey is course specific system and not many student registrations in this

field of study. This is also in accordance with Davis (1989) that people use IS if perceived useful and have personal relevance to their task.

5.5.3.1 ANOVA for testing different tasks and IS

Table 5.20: Different tasks and IS

	IS		
Tasks	EDS	myUNISA	Osprey
View assignments	69	239	19
Schedule meetings	13	19	0
Library information	57	157	6
Lecturer/student communication	94	138	57
Social chatting	19	38	19
Collaborative work	25	31	19
Post/read notices	57	151	44
Submit/post assignments	88	208	6
Posting/view lecturer notes	82	138	13

Hypotheses being tested are:

H_{or}: There are no differences in yield according to task

H_{oc}: There are no differences in yield according to IS

In this case the subscript 'r' refers to rows, which is about the effect of the tasks and the subscript 'c' refers to columns, which tests the effect of the IS type.

The ANOVA output is:

Table 5.21 : ANOVA: Two-Factor Without Replication

SUMMARY	*Count*	*Sum*	*Average*	*Variance*
View assignments	3	327	109	13300
Schedule meetings	3	32	10.66667	94.33333
Library information	3	220	73.33333	5900.333
Lecturer/student	3	289	96.33333	1644.333

communication				
Social chatting	3	76	25.33333	120.3333
Collaborative work	3	75	25	36
Post/read notices	3	252	84	3409
Submit/post assignments	3	302	100.6667	10321.33
Posting/view lecturer notes	3	233	77.66667	3920.333
EDS	9	504	56	936.75
myUNISA	9	1119	124.3333	6195
Osprey	9	183	20.33333	348.5

ANOVA

Source of Variation	*SS*	*df*	*MS*	*F*	*P-value*	*F crit*
Rows	32622.67	8	4077.833	2.397022	0.065045	2.591094
Columns	50272.67	2	25136.33	14.77558	0.000232	3.633716
Error	27219.33	16	1701.208			
Total	110114.7	26				

The results are not significant for both rows, and for the columns they are significant. It can be concluded that there are differences in yield due to the type of IS. Due to the fact that the effects of rows are not significant; it can be concluded that there is no evidence against the hypotheses that the yield is not affected by the type of task undertaken.

5.5.3.2 Dependency of use of specific tasks on the kind of IS

A chi-square test is performed to determine if that dependence is not there. As before, then independence would mean that (row total)×(row total)/(grand total) would be close to the observed values. The statistical hypotheses are:

H_0: IS types and use of certain tasks are independent

H_a: Use of IS on tasks and the IS are dependent

The test statistic is:

$$\chi^2 = \sum \frac{(O-E)^2}{E}$$

Where

Table 5.22: Dependency of use of specific tasks on the kind of IS

O	EDS	myUNISA	Osprey	**Row total**
View assignments	69	239	19	**327**
Schedule meetings	13	19	0	**32**
Library information	57	157	6	**220**
Lecturer/student communication	94	138	57	**289**
Social chatting	19	38	19	**76**
Collaborative work	25	31	19	**75**
Post/read notices	57	151	44	**252**
Submit/post assignments	88	208	6	**302**
Posting/view lecturer notes	82	138	13	**233**
Column total	**504**	**1119**	**183**	**1806**

Table 5.23: Expected Frequency on Dependency of use of specific tasks on the kind of IS

E	**EDS**	**myUNISA**	**Osprey**
View assignments	91.26	202.61	33.13
Schedule meetings	8.93	19.83	3.24
Library information	61.40	136.31	22.29
Lecturer/student communication	80.85	179.06	29.28
Social chatting	21.21	47.09	7.70
Collaborative work	20.93	46.47	7.60
Post/read notices	70.33	156.14	25.53
Submit/post assignments	84.28	187.12	30.60
Posting/view lecturer notes	65.02	144.37	23.61

with O = observed frequencies and

$$E = \frac{C_i T}{T_j}$$

Thus,

$$\chi^2 = \sum \frac{(O-E)^2}{E} = \frac{(69-91.26)^2}{91.26} + \ldots + \frac{(13-23.61)^2}{23.61} = 156.2702$$

Using the 5% significance level, df = (3 – 1)(9 – 1) = 16, the critical region is

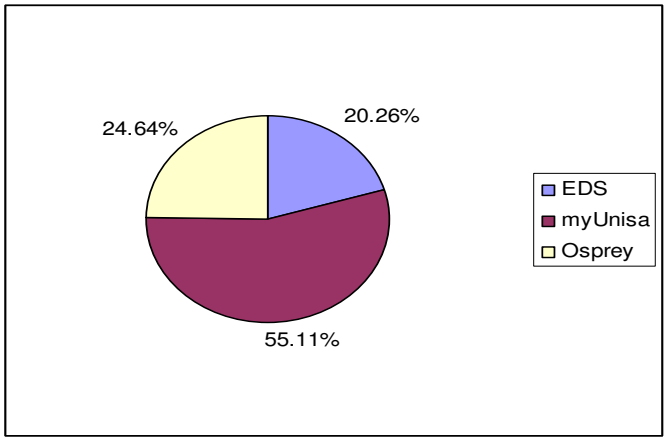
$$\{\chi^2 > 26.30\}$$

Since the calculated values of $\chi^2 = 156.2702$ falls in the rejection region, the suggestion that use of IS on specific tasks and the types of IS are independent of each other cannot be accepted. herefore, it can be concluded that the use of IS depends on specific tasks and depend on the kind of the system used. Kling (1999) stated that the consequences of IS depends on the context in which IS are developed and designed.

5.5.3.3 Use of IS in Courses

In using the different IS in the courses of UNISA, Figure 5.13 below shows that myUNISA was the IS used the most. Use of myUNISA in courses also exceeds the combined uses of EDS and Osprey. In the use in courses, Osprey is used more than EDS. EDS is the least used in courses, but is not far exceeded by Osprey. This is expected as myUNISA is the main IS provided for the use of students and academics. This is also in accordance with Kling (1999) who stated that the consequences of IS depends on the context in which IS are developed and designed.

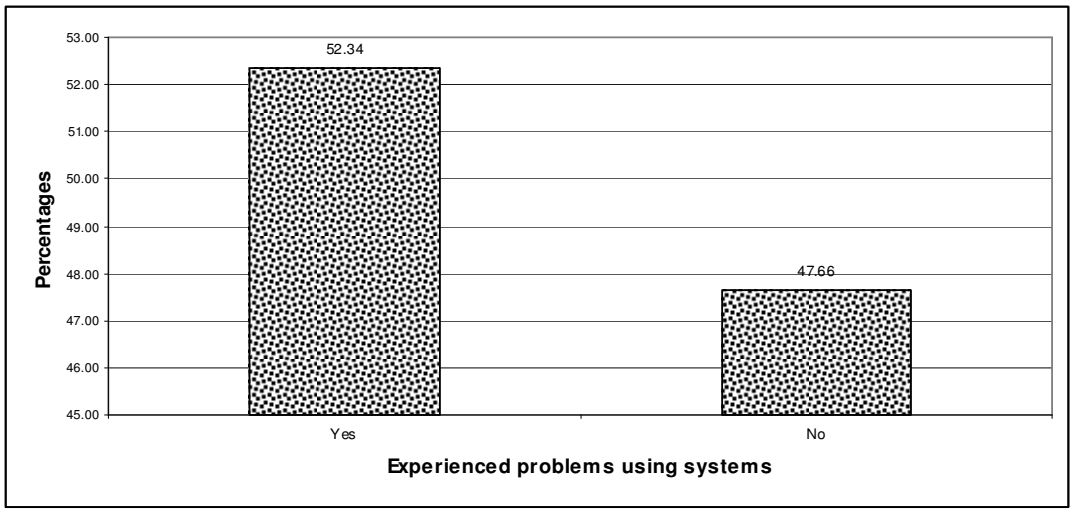
Figure 5.13: Use of IS in Courses



5.5.4 Miscellaneous impression about system

5.5.4.1 Experienced problems using systems

Figure 5.14: Experienced Problems using System



Another measure of a successful IS could be the amount of problems experienced by users. 50.34% of respondents reported that they had experienced problems with UNISA's IS. This is a relatively high rate of respondents that have experienced problems. This might mean that just over 50% of the students accessing UNISA's IS are frustrated by the systems. As indicated by Kling (1999) that this might be as a result of lack of user involvement in the design and planning of these systems.

5.5.4.2 Information content met user needs, Systems were easy to use, and Systems are user friendly

Table 5.24: Systems Success

Description:	Yes	No
Information Content met needs:		
Frequencies	290	94
Percentages	75.52	24.48
System easy to use:		
Frequencies	287	97
Percentages	74.74	25.26
System user friendly:		
Frequencies	296	88
Percentages	77.1	22.9
Necessary information available		
Frequencies	276	108
Percentages	71.88	28.12

Meeting usage needs, ease of use of IS and functionality are all determining factors of IS success. Table 5.24 shows that UNISA is successful in the IS it made available for its students and employees. Results reveals that, 75.52% of the respondents indicated that information content met their needs, 74.74% reveals that the Systems are easy to use, 77.1% indicated that the Systems are user friendly and 71.88% indicated that necessary information was available. The results reveal that higher percentage of users is satisfied with UNISA's Systems. Slightly fewer respondents are not happy with the systems UNISA made available. In the article written by McKeen *et al.* (1994) it was found that user participation in the development of an IS, may not necessarily lead to user satisfaction, but it is still a necessary antecedent.

Table 5.25: Prefer system modification

Like system modification	Yes	No
Frequencies	264	120
Percentages	68.75	31.25

Since a higher percentage of users were not involved in the development and implementation of these systems, this might be the reason why 68.75% feels that the systems need modification where their inputs should be taken into account. The remaining 31.25% feels that what they have is good enough for them.

5.5.5 Level of satisfaction with use of system

Table 5.26 Level of satisfaction

Satisfaction level	Completely	Satisfied, need room for improvement	Dissatisfied	Completely dissatisfied
Frequencies	120	264	0	0
Percentages	31.25	68.75	0.00	0.00

The results indicate that UNISA IS are reasonably successful as no users were dissatisfied and completely dissatisfied with the systems available to them. This is in agreement with Argawal and Prassad (1999) states that many people are not unhappy with systems.

5.5.6 Preferred medium in providing/receiving study material

Table 5.27: Preferred medium in study material

Preferred medium	EDS	myUNISA	Osprey
Frequencies	107	258	38
Percentages	26.55	64.02	9.43

Table 5.27 indicates that myUNISA is the most preferred medium to receive study material. This is logical since myUNISA was developed to improve flow

of academic information. Academic information comprises courseware, subject-related academic guidance, discussion groups, and recommended books. This also proves that most students are starting to accept these systems. This is in agreement with Kroeker (2000) who stated that IS affected education methodologies. It also support Dertouzos(1998) that IS mediate the way information is accessed, organised, stored and transmitted.

5.5.7 Medium used primarily for communicating

Table 5.28: Primarily used medium of communication

Used medium	EDS	E-mail	Osprey	myUNISA
Frequencies	69	246	38	164
Percentages	13.35	47.58	7.35	31.72

The results in Table 5.28 reveal that most of the respondents prefer e-Mail to communicate. The reason might be that they want to establish a personal kind of a relationship which is non-existence in distance learning environment.

5.5.8 Preferred form of communicating with students/lecturers

Table 5.29: Preferred form of communication with students/lecturers

Preferred communication	EDS	E-mail	Osprey	myUNISA
Frequencies	63	271	31	157
Percentages	12.07	51.92	5.94	30.08

Table 5.29 re-emphasizes the fact that higher percentage of respondents prefers e-Mail to communicate. The other reasons might be issues of integrity and privacy and also most people logon to their e-Mails than other forms of IS available for them.

5.5.9 Preferred form of communicating with peers for university work

Table 5.30: Preferred form of communication with peers for work

Preferred communication	EDS	E-mail	Osprey	myUNISA
Frequencies	57	264	19	132
Percentages	12.07	55.93	4.03	27.97

Regarding the form of communication among peers (i.e. from students to students and from lecturers to lecturers), Table 5.30 shows that about 57 (12.1%) respondents used EDS, 264 (55.9%) used e-Mail, 19 (4.0%) used Osprey and 132 (28.0%) used myUNISA. The reason again may be the issues of integrity and privacy. Also people respond more quickly while using e-Mails other than any form of communication. The other reason is the fact that most people have access to their e-Mails wherever they are and can keep communication going. This is in agreement with Yusuf (2005) that IS provides opportunity for users to communicate with one another through e-Mails, mailing lists, chat rooms and so on.

As a result the social relationships of users are affected by the IS that they use for communicating with their peers. The structures of those relationships are moulded around the IS that are used as a communication medium.

5.6 Preferred option

5.6.1 Valued option

In this case overlapped also occurred and the totals will be greater than the sample size.

Table 5.31: Valued option

Valued option	EDS	Osprey	myUNISA
Frequencies	170	183	371
Percentages	23.48	25.28	51.24

In testing the valued IS among EDS, myUNISA and Osprey, Table 5.31 shows that about 170 (23.5%) respondents valued EDS, 183 (25.3%) used Osprey, and 371 (51.2%) used myUNISA. This seems logical since myUNISA is the most publicized system in the university. Respondents might value the system because they are only exposed to it, and forced to use it as it is the only system where information pertaining to courses and study letters are posted and students have no choice but to use if they want to succeed in the courses they are registered for. This is in agreement with Clow (1999) that student perceptions of technology are important in the future of distance learning. Also authorities of the university have decided that as from 2009 access to myUNISA will be a registration requirement.

In testing the valued IS that enhances studies, myUNISA was considered by (56.1%) as a system that makes their learning environment more conducive to study.

5.6.3 Involvement in development

Table 5.32: Preferred involvement in developing

EDS	Osprey	myUNISA
151	201	359
21.24	28.27	50.49

User involvement and participation in the development and/or implementation of a successful IS is important. Users' involvement in the development and implementation of these IS, can be described as their willingness to participate in the development and improvement of the university's IS, and users view on the effect of their input on the quality of those systems. Users said that they would be willing to participate in the development of UNISA IS that are built for them, whilst 50.49% would willing to only participate in the development of MyUNISA. The remaining 21.24% and 28.27% of users are willing to participate in development EDS and Osprey respectively. This is in accordance with Barki and Hartwick (1989) that user involved when s/he

considers a system to be both important and personally relevant. Table 5.32 shows preference of systems which respondents want to participate and to be involved in.

5.6.6 Wanted IS

Table 5.33: Option wanted

EDS	Osprey	myUNISA
170	132	327
27.03	20.99	51.99

Quality of UNISA IS can be influenced to some extent by whether or not users were asked whether they wanted or needed any of the specified UNISA IS. It can therefore be said that, just by merely asking users whether they want or need the Information System can increase the success of that system. This is in agreement with Kling (1999). The question wanted to determine the IS wanted by the respondents. Table 5.33 shows that about 170 (27.0%) of the respondents wanted EDS, 132 (21.0%) wanted Osprey, and 327 (52.0%) wanted myUNISA.

5.6.7 Needs taken into account in development

Table 5.34: Option considered needs

EDS	Osprey	myUNISA
113	113	308
21.16	21.16	57.68

This question is another question where overlaps occurred. Some respondents used more than one IS. Thus the total frequencies reflects a higher total than 384.The question wanted to determine if the respondents believed that their needs were considered in the development of specific IS. Table 5.34 shows that about 113 (21.2%) of the respondents believed that for EDS their needs was considered, 113 (21.2%) believed that for them, Osprey considered their needs, and 308 (57.7%) believed that development of

myUNISA considered their needs. Those who feel that their needs have been taken into account perceive UNISA IS to be of good quality and the majority of those users who feel that their needs have not been taken into account; perceive UNISA IS to only be of acceptable quality. In all cases it showed that myUNISA forms the integral part of students' lives at UNISA. This is again in accordance with Argawal and Prasad (1999) who stated that many people are not unhappy with systems.

5.7 Conclusion

This Chapter provided an analysis of the data obtained from the empirical study. A description of how the results were calculated and interpreted was given. This was done to determine the Social Impact of Information Technology at UNISA. The IS investigated were myUNISA, EDS and Osprey.

The UNISA IS were explored from various uses.The study found that the dominant IS used by majority of users at UNISA is myUNISA. In addition, the research reveals in Section 5.4 that over 80% of users were not consulted in developing and implementing UNISA IS. However, users feel that their needs have been taken into account and they are also willing to participate in future development and implementation of UNISA IS. It can be concluded that UNISA IS is relatively successful in delivering in meeting the needs of community of users.

The success of a system is determined by the community of people who use it. Therefore it is imperative that UNISA considers social context of its users when designing and implementing Information System. In addition, since myUNISA is the most accessed Information System of the three, it will be more logical to consolidate the best functionality of the two systems EDS and Osprey

In Chapter Six, the conclusions drawn from both the literature reviewed and the empirical research findings will be discussed. Some recommendations that can be used to improve the UNISA Information Technology will be made and areas for further research on the subject suggested

CHAPTER 6

CONCLUSION AND RECOMMENDATION

6.1 Introduction

As indicated earlier in previous chapters, this study's context is in the field of Social Informatics. Social Informatics (SI) refers to the body of research and study that examines social aspects of computerization, including the roles of information technology in social and organizational change, the uses of information technologies in social contexts, and the ways that the social organization of information technologies is influenced by social forces and social practices (Kling, 2000). Due to the IS implications of this study, this research falls within the parameters of the department responsible for the development of UNISA's IS.

The main aim of the research was to establish the level of Social Impact of IS at UNISA. The problem is that users of UNISA's IS were not involved in the development and/or planning of these systems. The research questions were, (1) What is the impact of the UNISA IS within the institution? (2) In what ways does the social relationships of users during system development/planning impact on IS? (3) To what degree are the users of the UNISA IS involved and participating in the development and/or planning of these systems? (4) How does user involvement and participation relate to IS success? (5) What social factors influence the development and/or planning of IS?

Social issues permeate any technology, including its origin, its use, and its demise (University of California, 2003). According to Kling (2000) the social impact of an IS are the users. Users play a role in the success of an IS, but the social implications that affect them are not fully accounted for by system designers and those implementing the system. In the Extreme Chaos Study (2001) it was found that in the year 2000, lack of user involvement was noted as the number one cause of project failure.

This chapter will present the summary of the study, will answer the research questions, provide managerial guidelines, provide future research in this field of study. Conclusion of the study will be drawn and recommendations will also be outlined.

6.2 Summary of the Study

The organization that formed the basis of this Study is the University of South Africa (UNISA). Items that were investigated are, MyUNISA which is use to facilitate learning at the institution, Electronic Delivery System (EDS) use to facilitate learning for students registered for the Master of Business Leadership (MBL) and Doctor of Business Leadership (DBL) through UNISA's School of Business Leadership (SBL) and Osprey which use to facilitate learning by students registered for Computer Science and IS in the School of Computing.

The research was aimed at determining the level of impact UNISA's IT has on its community of users. To determine to what extent the user of UNISA's IS were involved and participated in the development and/or implementation of these systems. The research questions arrived at are as indicated in paragraph 2 of Section 6.1. The questionnaires used are as indicated in Appendix A of this report.

This study analysed the effects of UNISA's IS from Social Informatics perspectives. It was noted that social impact of IS are rarely taken into account when systems are being developed and/or planned. A major social impact of an IS are the users. Users play a role in the success of an IS, but the social implications that affect them are not fully accounted for by system designers\analysts and those implementing the system.

The study revealed that even though over 80% of respondents were not involved or participated in the development and implementation of UNISA's IS

as indicated in Section 5.4 of this report, but Section 5.3.4 indicated that the users are reasonably satisfied with the IS provide to them by UNISA.

6.3 Response to Research Questions

The main findings of this research in relation to each research question will now be discussed. Each question is followed by a discussion of the findings relating to that question.

6.3.1. What is the Social Impact of UNISA IS within the institution?

From Kling (2000) it can be concluded that IS have an effect on the Social relationships of users. The Social relationships of users are affected by the IS that they use for communicating. The structures of those relationships are moulded around the IS that are used as communication medium.

According to Section 5.2.5 most respondents (63%) indicated that they do not have access to the internet at their residences, and at the same time study material, notices and other form of information that can enhance learning is posted on these systems for students to access, of which majority of students have no access. The impact this have on community of users is that these systems contribute to the unaccessibility of academic staff as students are always referred to this systems for more information which impact negatively on their academic progress.

Even that is that the case Section 5.6.1 indicates that respondents view these systems of value and aid their learning. It can be concluded that the impact is two folded. The social relationship with academic staff is impacted negatively by these systems. UNISA is operating in the third world with the characteristics of first world and this on its own affects the entire social structure of community of users.

6.3.2 In what ways does the social relationships of users during systems development/planning impact on IS?

According to Kling (2000), the Internet era, or more specifically public access to the Internet, raises issues about changes in areas such as working at home, communication, entertainment, and other personal issues. IS have become heavily used and relied upon and therefore social implications of IS for users have become prevalent. ICT are an integral part of some organisations and so shape identity and institutions (Lamb & Kling, 2003). People routinely use computers, information products and other ICT's in their daily lives. These technologies shape who they are as organisational representatives, their relationship with other people in the organisation as well as their perceptions about themselves (Lamb & Kling, 2003).

An example of a social consequence of IS's on users is given by Kling (1999). The development of an IS may reduce the amount of paper produced and used, systems designers may however may not realize that paper plays important roles in some places where one wouldn't think it would be used. This could have social consequences for users of the system. Rosenbuaum and Sawyer (2000) suggest that the use of ICT's often lead to both intended and unintended consequences included in this are the social consequences for users. In summary IS's have social consequences and these consequences need to be considered when IS's are designed and implemented. The consequences of IS's depend on the context in which systems are developed, implemented, and used (Kling, 2000). As indicated in Section 5.5 it shows that traditional in-person or telephonic conversations is been replaced by this Systems for social chatting at UNISA.

6.3.3 To what degree are the users of the UNISA IS involved and participating in the development and/or planning of these systems?

User involvement is described as subjective psychological state reflecting the importance and personal relevance of a system to the user. User participation is described as set of behaviours or activities performed by users in the

system development process (Kling, 2003). From Section 5.4.1 it shows that 80 % of the respondents did not participate at all in the development and/or implementation of any of the specified UNISA's IS. Users were not even asked if they wanted the implementation of the specified IS, or what they wanted in terms of their needs. User acceptance has a lot to do with the users' involvement in the development and/or implementation of an IS. According to Kling (2003), it is important to note the difference between voluntary versus forced acceptance.

It goes to say that users involvement does not affect acceptance if there is forced acceptance, as the user has no choice but to use the IS, whereas users involvement does affect user acceptance if the acceptance is voluntary. Therefore it is necessary to have positive user involvement when acceptance of an IS is left up to the user. UNISA's IS were forced on the users.

6.3.4. How does user involvement and participation relate to IS success?

In Section 5.4.5 it is indicated that 85 % of respondents are willing to be involved and participate in the development and implementation of UNISA's IS. If the success of an IS is measured by user satisfaction and user participation in systems development is related to user satisfaction, then user participation is essential for the success of an IS (McKeen *et al.*, 1994). In the article written by McKeen *et al.* (1994) it was found that user participation in the development of an IS, may not necessarily lead to user satisfaction, but it is still a necessary antecedent for the success of IS.

It can also be argued that a successful IS is one that users of that system are satisfied with, perceive the system to be of high quality, their needs are satisfied and the IS does what it was designed to do. Section 5.3.4 indicates that nearly 2% users are not satisfied with UNISA's IS, hence UNISA's IS is reasonably successful.

6.3.5 What social factors should influence the development/planning of IS?

According to Havelka (2002) characteristics and attributes of the users of the system being developed are expected to influence the systems' success in a variety of ways. Each of these factors is described below.

Bias is defined by Havelka (2002) as the users' "willingness to change." This includes the users' willingness to try new technological approaches to support the work system or changes to the business processes that make up the work system itself. It is generally accepted that most individuals have a natural tendency to resist change. This may impact a project's success by users insisting that the new system work the same way the old one did, e.g. that a printed report must be in the exact same format or that a printed report is required at all.

User commitment is defined by Havelka (2002) as the level of importance the users being affected by the application place on the project's successful completion. This reflects their level of emotional or psychological obligation to the project. This construct is expected to be similar to team motivation and management commitment. The users' commitment to the project would be expected to directly impact the project's success by influencing the amount of time users are willing to dedicate to the project. Users that want the project to succeed will be more willing to provide documents, answer questions, and perform other development activities.

Users' communication skills were defined by Havelka (2002) as the writing, speaking, and listening skills of the users participating in the IS Development project. The primary reason for user participation in systems development is to transfer their job knowledge. Without an adequate level of communication skills, the communication and interaction between the users and IS personnel may be difficult. Without adequate communication skills, the users' may be willing to provide the information needed for a successful project, but not able

to express their requirements to the IS personnel, other users, or management.

Users' computer literacy is defined by Havelka (2002) as the level of knowledge and understanding that the users' possess regarding computers, software, and technology in general. If users are more computer literate, communication between IS personnel and users may increase because the users can understand some of the computer jargon. Also, as computer literacy increases users may be more likely to accept new technology, this is the may display less bias. Also, if users tend to be computer savvy they may have more realistic expectations with regard to what can and cannot be accomplished using Information Technology as well as toward the amount of time and money needed to design, construct, and implement new software.

User ownership is defined by Havelka (2002) as a psychological attachment to the system or business process for which a new system or software is being developed or implemented. Similar to user commitment, but focused on the business activities, user ownership may have a positive or negative impact on IS Development project success. If a user with a strong feeling of ownership believes that a new system will help the m perform their activities better or quicker, this may increase user commitment to the project and positively impact project success. However, if a user with a strong feeling of ownership to the business process sees the project as threatening the process, increasing their workload, or eliminating their job; this will decrease commitment and negatively impact project success.

User participation is defined by Havelka (2002) as the active, substantive participation of the actual users of the application in the development process. This includes identifying the correct end users and their performance of specific tasks and activities during IS Development. The proper type and amount of user participation in IS Development is still a matter of debate within industry and the academic world. New techniques such as extreme programming, that minimizes the user's participation, are being suggested as the most productive IS Development methods while at the same time the

socio-technical approach is still popular and has many dedicated advocates. User participation in the IS Development process has had a great deal of attention and yet the effect of participation on project success is not well understood. It would seem likely that a contingency approach for user participation in IS Development based on the type of system, management goals, etc. is appropriate.

Users' understanding of the current system is defined by Havelka (2002) as the level of knowledge that the users participating in the IS Development process have regarding current manual and computer based processes and procedures used to perform their duties. Users that have a high level of understanding of the current system should be able to point out specific problems and areas for improvement that can be incorporated into the new system. One the other hand, users that do not understand the current system or how it is related to other operations of the business may not be able to provide the details needed to automate processes and may resist efforts to streamline or eliminate redundant processes or system outputs (Havelka, 2002).

The users' understanding of needs by Havelka (2002) is defined as the level of knowledge that the users who are participating in the development process have regarding the information required to perform their duties. This includes knowledge about the information outputs required and the processing and data required to produce this output. Again, the primary reason for the participation of users in the IS Development process is to determine the information requirements needed for the users to perform their job activities. For this transfer of knowledge to occur, the users must have some idea of what these information requirements are.

6.4 Limitations

In this study the sample was both students and staff members, the author did not split them and will do so in future papers.

6.4 Managerial Guidelines

From the results of this study the following guidelines are given to tertiary institutions that already have, or are planning to develop/implement IS for the use of lecturers and students:

- Users needs should be taken into account whether or not they understand.
- IS affect the social aspects of users; therefore these impacts must be taken into consideration before implementing these systems.
- Most users want to participate and feel that they can add value to the development/implementation of IS built for them.
- Users must participate and be positively involved in IS development/ implementation for it to be truly successful.
- Users' needs must be taken into account, using best practice isn't sufficient.
- University IS are reasonably successful, but are not as effective as they could be. By accounting for the social aspects of these systems, their successfulness and effectiveness can be optimized.
- IS have the potential to add value to and increase the effectiveness of educational practices, but also have the potential to impact immensely on the encompassing community. This must be considered before implementing any IS.

6.5. Future Research

This study contributes various opportunities for further research, notably:

- Studies involving students from different colleges be undertaken separately and findings be compared
- Gaps in the least preferred systems be determine
- Research be undertaken to determine a more comprehensive system combining the strengths of all the UNISA's IS.
- Research be undertaken to close the gap between Social Impact of IS on community of users and Information Technology Adoption.

6.6. Conclusion

The different social impact of IS is important to their success and has a influence on these systems and their users. The Study intended to investigate this social impact in the context of University IS, how they impact on the users of those systems and how those aspects affect the success of those systems.

It can be said that a broader view of users as social actors is needed for IS developers to fully understand the needs of users and the social impact of the IS. Users' perception of IS usefulness and ease of use has an impact on the users' view of the quality of the system. It can also be proposed that user participation and involvement is necessary for IS success, but having it does not necessarily guarantee IS success.

Tertiary Institution IS do have an effect on social relationships, as they can change the structure of many of the relationships that user may have, be it relationships with fellow peers, students, lecturers or friends.

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APPENDIX A: INFORMED CONSENT

Voluntary questionnaires for Students and Staff that use University Information Systems

GRADUATE SCHOOL OF BUSINESS LEADERSHIP

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Purpose

The purpose of the research is to assess the social impact of UNISA Information System e.g. MyUNISA, Osprey and EDS. The aim of the questionnaire is to measure users' awareness and perception of UNISA Information Systems and the extent to which users' have been involved in the development of UNISA Information Systems.

Note to participants

Your participation is completely voluntary, however you input is essential. Please answer all questions and as truthfully as you can and be sure to read and follow the instructions for each part. The questionnaire will be treated confidential. The results of the study will be made available to the participating individuals on request and may be used to improve UNISA Information Systems.

DECLARATION OF CONSENT

I…… (Full names of participant) hereby confirm that I have read the Information form, I understand the contents of this document and the nature of the research project, and I consent to participating in the research project. I understand that I am at liberty to withdraw from the project at any time, should I so desire.

……

……

SIGNATURE OF PARTICIPANT DATE

The following questions are meant only for statistical purposes. The results of the study will not disclose any of the participants' names, but the results will be treated as a collection of all the participants' responses. To complete the questionnaire please select your choice by ticking the box that matches your selection and filling in where necessary.

APPENDIX B: QUESTIONNAIRES

Part A – Participant's Details

(Please select only one answer per question)

1. What is you occupation? Student ☐ Staff ☐

2. Please indicate into which age group you fall within:

0 -17 ☐ 18 - 24☐ 25 - 34 ☐ 35 - 44 ☐ 45 - 59 ☐ 60> ☐

3. What College are you in? Management Studies ☐ Other ☐

_____

4. If you are a student, what is your year of study?

1st ☐ 2nd ☐ 3rd ☐ Honours ☐ Masters ☐

Doctorate ☐

5. Do you have access to the Internet at your residence? YES ☐ NO ☐

6. What is your primary method of accessing the Internet?

At home ☐ At UNISA ☐ Other ☐ _____

Part B – User's awareness and satisfaction with UNISA Information Systems.

7. Which of the following University Information Systems are you aware of?

University Website ☐ EDS ☐ MyUNISA ☐

Student System ☐ e-Mail ☐ Osprey ☐

8. Which one of these do you use?

University Website ☐ EDS ☐ MyUNISA ☐

Student System ☐ e-Mail ☐ Osprey ☐

9. Are you satisfied with Information System services provided to you by UNISA?

Completely Satisfied ☐ Reasonably Satisfied ☐ Not satisfied ☐

Completely Unsatisfied ☐

10. What is your overall perception of the quality of the UNISA Information Systems?

Excellent ☐ Good ☐ Acceptable ☐ Poor ☐

Part C - Users' involvement and participation in the development of UNISA Information Systems.

11. Were you involved in the development of any of the UNISA Information Systems mentioned in question 8? YES ☐ NO ☐

12. If so, which one/s were you involved in?

University Website ☐ EDS ☐ Student System ☐

Osprey ☐ e-Mail ☐ MyUNISA ☐

13. Do you feel that your needs have been taken into consideration during the development and implementation of the UNISA Information Systems?

YES ☐ NO ☐

14. Were you asked whether you wanted or needed the UNISA Information Systems previously motioned in question 8? YES ☐ NO ☐

15. Would you be willing to be involved in the development of UNISA Information Systems? YES ☐ NO ☐

16. Would you be willing to be involved in the improvement of the UNISA Information Systems? YES ☐ NO ☐

17. Do you feel that your opinions/knowledge would improve the quality of the Information Systems? YES ☐ NO ☐

Part D – User's use and satisfaction with the UNISA's Electronic Delivery Systems (EDS), MyUNISA & Osprey

18. (i) Which of your courses do you participate in EDS for?

a. _____ b. _____

c. _____ d. _____

(ii) Which of your courses do you participate in MyUNISA for?

a. _____ b. _____

c. _____ d. _____

(iii) Which of your courses do you participate in Osprey for?

a. _____ b. _____

c. _____ d. _____

19. (i) How often do you participate in? (Make a tick on appropriate block)

Period	**EDS**	**MyUNISA**	**Osprey**
At least Once a day			
At least Once a week			
At least Once a month			
Never			

20. Which of the following do you participate in for……..? (Make a tick in the appropriate block)

	EDS	**MyUNISA**	**Osprey**
Viewing assignments			
Scheduling meetings			
Information Library			
Communicating between lecturer and student			
Social chatting			
Collaborative work			
Posting/Reading notices			
Submitting/posting assignments			
Posting/Viewing lecture notes			

21. (i) Have you experienced any problems using the systems? YES ☐ NO ☐

(ii) Did the information content meet your needs ? YES ☐ NO ☐

(iii) Were the systems easy to use? YES ☐ NO ☐

(iv) Are the systems user friendly? YES ☐ NO ☐

(v) Was necessary information available? YES ☐ NO ☐

(vi) Would you like the systems to be modified/ redesigned? YES ☐ NO ☐

22. What is the level of your satisfaction with these systems?

Completely Satisfied☐ Satisfied, but room for improvement ☐

Unsatisfied ☐ Completely Unsatisfied ☐

23. What is your preferred medium for providing/receiving study material?

EDS ☐ MyUNISA ☐ Osprey ☐

24. Which medium do you use primarily for communicating with your students/lecturer?

EDS ☐ E-Mail ☐ Osprey ☐ MyUNISA ☐

25. What is your preferred form of communication with your students/lecturer?

EDS ☐ E-Mail ☐ Osprey ☐ MyUNISA ☐

26. What is your preferred form of communication with your peers for university work?

EDS ☐ E-Mail ☐ Osprey ☐ MyUNISA ☐

27. Complete the following sentences by circling your preferred option:

a. I find	**EDS**	**OSPREY**	**MyUNISA**
	Of Value /no value).	**Of Value /no value**).	**Of Value / no value**).
	N/A	N/A	N/A

b. I find that ……..my studies	**EDS**	**OSPREY**	**MyUNISA**
	aids/inhibits	**aids/inhibits**	**aids/inhibits**
	N/A	N/A	N/A

c. I **was/ wasn't** Involved in the development of…..	**EDS**	**OSPREY**	**MyUNISA**
	was/wasn't	**was/wasn't**	**Was/wasn't**
	N/A	N/A	N/A

d. If I was involved in the development, I feel the quality of each will be	**EDS**	**OSPREY**	**MyUNISA**
	better/the same/worse	**better/the same/worse**	**better/the same/worse**
	N/A	N/A	N/A

e. I will be willing to be involved in the development of	**EDS**	**OSPREY**	**MyUNISA**
	YES/ NO	**YES/ NO**	**YES / NO**
	N/A	N/A	N/A

f. I was asked if I wanted or what I wanted out of	**EDS**	**OSPREY**	**MyUNISA**
	YES/ NO	**YES/ NO**	**YES/ NO**
	N/A	N/A	N/A

g. I feel that my	**EDS**	**OSPREY**	**MyUNISA**

needs as a student/lecturer **<u>have</u>** been taken into account in the development and implementation	**YES/NO**	**YES/NO**	**YES/NO**
	N/A	N/A	N/A

28. Please provide any other information you may consider to be relevant to this study:

.....
.....
.....
.....
.....

THANK YOU FOR YOUR PARTICIPATION IN THIS STUDY.
YOUR PARTICIPATION IS GREATLY APPRECIATED

APPENDIX C

1 Occupation

Student	Staff	
233	151	384
60.68%	39.32%	

2 Age group in years

0 - 17	18 - 24	25 - 34	35 - 44	45 - 59	> 60	
0	101	151	101	25	6	384
0.00%	26.30%	39.32%	26.30%	6.51%	1.56%	

3 College you are in

Management studies	Other	
107	277	384
27.86%	72.14%	

4 If student, year of study

1st year	2nd year	3rd year	Hons	M	D			
94	50	88	25	57	13	327	57	384
24.48%	13.02%	22.92%	6.51%	14.84%	3.39%		14.84%	

5 Have Internet access at residence

Yes	No	
142	242	384
36.98%	63.02%	

6 Primary Internet access method

Home	Unisa	Other	
76	239	88	403
18.86%	59.31%	21.84%	

7 Info Systems you are aware of

Unisa Website	myUnisa	Osprey	EDS	Student system	E-mail	
246	302	69	88	113	238	1056
23.30%	28.60%	6.53%	8.33%	10.70%	22.54%	

8 Option you use

University Website	EDS	myUnisa	Student system	E-mail	Osprey	
214	82	252	101	214	63	926
0.231101512	0.0886	0.272138	0.109071	0.2311	0.06803	

9 Satisfaction with Unisa Info systems

Completely	Reasonably	Not satisfied	Completely unsatisfied	
145	233	6	0	384
37.76%	60.68%	1.56%	0.00%	

Your overall perception of Unisa's Info Systems quality

Excellent	Good	Acceptable	Poor			
31	208	138	6	383	1	384
8.07%	54.17%	35.94%	1.56%		0.26%	

You were involved with Unisa Info System development

Yes	No	
76	308	384
19.79%	80.21%	

If involved with Info System development, state the one you were involved in

University Website	EDS	Osprey	myUnisa	E-mail	Student system	
3	0	2	71	0	0	76
3.95%	0.00%	2.63%	93.42%	0.00%	0.00%	

Feel that your needs were considered during Info Systems development and implementation

Yes	No	No response	
214	145	25	384
55.73%	37.76%	6.51%	

You were asked what you wanted Unisa's Info systems

Yes	No	No response	
94	277	13	384
24.48%	72.14%	3.39%	

You are willing to be involved to develop Unisa's Info systems

Yes	No	No response			
327	50	7	384	0	384
85.16%	13.02%	1.82%		0.00%	

You are willing to be involved to improve Unisa's Info systems

Yes	No	No response	
340	38	6	384
88.54%	9.90%	1.56%	

You feel that your opinion/knowledge would improve Unisa' Info systems' quality

Yes	No	No response	
352	25	7	384
91.67%	6.51%	1.82%	

Rate of use in Unisa courses

EDS	myUnisa	Osprey	No response	
107	232	44	88	471
0.227176221	0.4926	0.093418	0.186837	

Frequency of access

Days	EDS	myUnisa	Osprey	
>0 per day	50	82	57	189
>0 per week	31	157	13	201
>0 per month	6	88	38	132
Never	38	13	44	95
	125	340	152	617

Miscellaneous use of system

Days	EDS	myUnisa	Osprey	Total
>0 per day	8.10%	13.29%	9.24%	30.63%
>0 per week	5.02%	25.45%	2.11%	32.58%
>0 per month	0.97%	14.26%	6.16%	21.39%
Never	6.16%	2.11%	7.13%	15.40%
Total	20.26%	55.11%	24.64%	

	EDS	myUnisa	Osprey	Total
View assignments	3.82%	13.23%	1.05%	18.11%
Schedul meetings	0.72%	1.05%	0.00%	1.77%
Library information	3.16%	8.69%	0.33%	12.18%
Lecturer/student communication	5.20%	7.64%	3.16%	16.00%
Social chatting	1.05%	2.10%	1.05%	4.21%
Collaborative work	1.38%	1.72%	1.05%	4.15%
Poste/read notices	3.16%	8.36%	2.44%	13.95%
Submit/post asignments	4.87%	11.52%	0.33%	16.72%
Posting/view lecturer notes	4.54%	7.64%	0.72%	12.90%
Total	27.91%	61.96%	10.13%	100.00%

	EDS	myUnisa	Osprey	
View assignments	69	239	19	327
Schedul meetings	13	19	0	32
Library information	57	157	6	220
Lecturer/student communication	94	138	57	289
Social chatting	19	38	19	76
Collaborative work	25	31	19	75
Poste/read notices	57	151	44	252
Submit/post asignments	88	208	6	302
Posting/view lecturer notes	82	138	13	233
	504	1119	183	1806

Miscellaneous impression about system

(i) You experienced problems using systems

Yes	No	
201	183	384
52.34%	47.66%	

(ii) Information content met your needs

Yes	No	
290	94	384
75.52%	24.48%	

(iii) Systems were easy to use

Yes	No			
287	97	384	0	384
74.74%	25.26%		0.00%	

(iv) Systems are user friendly

Yes	No	
296	88	384
77.08%	22.92%	

(v) Necessary information was available

Yes	No			
276	108	384	0	384
71.88%	28.13%		0.00%	

(vi) You like systems to be modified/redesigned

Yes	No	
264	120	384
68.75%	31.25%	

Your level of satisfaction with use of system

Completely	Satisfied, need room for improvement	Unsatisfied	Completely unsatisfied	
120	264	0	0	384
31.25%	68.75%	0.00%	0.00%	

Your preferred medium in providing/receiving study material

EDS	myUnisa	C	
107	258	38	403
26.55%	64.02%	9.43%	

Medium used primarily for communicating with students/lecturers

EDS	E-mail	Osprey	myUnisa	
69	246	38	164	517
13.35%	47.58%	7.35%	31.72%	

Preferred form of communicating with students/lecturers

EDS	E-mail	Osprey	myUnisa	
63	271	31	157	522
12.07%	51.92%	5.94%	30.08%	

Preferred form of communicating with peers for university work

EDS	E-mail	Osprey	myUnisa	
57	264	19	132	472
12.08%	55.93%	4.03%	27.97%	

Preferred option

EDS	Osprey	myUnisa	
170	183	371	724
23.48%	25.28%	51.24%	

EDS	Osprey	myUnisa	
132	164	378	674
19.58%	24.33%	56.08%	

EDS	Osprey	myUnisa	
151	201	359	711
21.24%	28.27%	50.49%	

EDS	Osprey	myUnisa	
145	195	352	692
20.95%	28.18%	50.87%	

EDS	Osprey	myUnisa	
164	176	365	705
23.26%	24.96%	51.77%	

EDS	Osprey	myUnisa	
170	132	327	629
27.03%	20.99%	51.99%	

EDS	Osprey	myUnisa	
113	113	308	534
21.16%	21.16%	57.68%	