An Empirical Investigation into the Social Impact of Information Systems at a Tertiary Institution in a Developing Country

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Abstract

This study explores the problems that exist when society interacts with Information Systems (IS). IS brings expected and unexpected implications that may include social, environmental and IS failures. The problem is that these systems were developed without taking into consideration the impact of IS on its users. The organisation that is studied is North West University, Mafikeng Campus. A quantitative research approach was used for this study. Results indicate that a small number of the respondents were involved in the planning and development of the NWU IS and because of this, the social impact of users was not taken into account. The study suggests some guidelines that can be followed by developers of the university's IS when developing and implementing IS in future.

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

Introduction

Technology always replaces certain activities that are normally done by people and these people are later exposed to the changes that technology brings (Lubbe, Singh & Hall 2007). It is noted that IS resultantly brings expected and unexpected implications on users including their social environment. IS is described as the transformation of human activities that follow the implementation, use and adoption of computers in different types

of organisations (Davenport 2008). Lubbe and Bopape (2012) regard them as technologies that are used in the creation, retrieval, manipulation, processing, interpretation and transmission of data to gain knowledge and facilitate communication In addition, these IS provide support, contribute and facilitate the creation of a good working environment for users in organisations. However, the designers of IS focus on the daily operations of users in organisations rather than their social context. This results in unsuited applications, difficult to use and failure of IT systems.

This study is therefore grounded in the philosophy of social informatics. According to Lubbe and Bopape (2012), social informatics is 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. This study investigates the degree of involvement of the users of IS at a tertiary institution during the development of these systems.

North West University (Mafikeng Campus) has several systems that are used by lecturers and students. Some of the systems are efundi and Groupwise that are used as a communication tool and for providing teaching and learning materials. Efundi is used for writing tests and quizzes, submitting assignments and projects, communication between lecturers and students by sending messages and to upload and download study materials. Groupwise is used for sending and receiving emails to and from lecturers, and they can also submit their assignments and projects.

The study is about cooperation between developers and users in ICT. The rest of the paper is as follows: A brief background to the problem and the problem statement is given, literature review is discussed next, then the methodology and the results are discussed last.

Background to Problem Statement

Mafikeng Campus is one of the three campuses that merged in the year 2004 to form North West University (NWU 2010). The other campuses are Potchefstroom Campus and Vaal Campus. All three campuses use systems that are very useful to the students who enrol at these campuses as well as their lecturers.

The systems that are used by students and lecturers may be developed in house and some can be bought off-the-shelf, customised to suit local needs and implemented. At times, this is all done without asking the users

what they require the systems to be like and how information should be put in these systems. This brings difficulties in the adoption and use of the systems by the intended users. The input of users during development and implementation can increase the ease of use. This will lead to the improved acceptance of the systems and their success as obligatory passage points among users.

Problem Statement

As stated earlier, the focus of this study is on the Mafikeng campus with approximately more than 10 000 students enrolled for the 2011 academic year. The University has various IS that are used by the students and lecturers as a means of communication and also for students to access information and resources for their modules. Not all students are familiar with these IS. They therefore struggle to locate the information that could help them with their studies.

It is stated that the systems may have been designed and developed without the students' input. The links that have the relevant information are placed where it's not easy to find. Students access study materials, type assignments and submit the assignments electronically and also some write quizzes and tests using some of these systems such as efundi, and GroupWise.

The problem may not only lie with the lack of user involvement in the design and implementation of IS, but also with inherent users' resistance to change. There is a barrier between ICT developers and users that prevent developers to ask users from contributing towards the design and development of new systems or the upgrading of existing systems. The next section looks at the extant literature in the field social informatics and related disciplines.

Overview of the Literature

The following keywords were used to search for information on Google Scholar, Journals of Information Science and a database called ScienceDirect: IS, socio-technical systems, IT, user acceptance and technology adoption, social context, user involvement.

Reform in Society

The information society is described as the society that is shaped by the power and assistance of information and communication technologies. But the information society faces problems of attaining levels of ensuring access to all with the newest ICT (Gökalp 2010). The information society has been aided by Information Technology (IT) that affects social, cultural, economic and political fields that lead to an increase in the production and effectiveness of economic development (Gökalp 2010). He also states that the information society development shows increases in different things including developments in science and technology.

In the past two decades, the information society has witnessed major technology development changes. These changes were in the form of the Internet and advancements in computers. These changes among other things reformed the education and other sectors of society (Demirci 2009). Demirci also notes that new technology is not quickly distributed in society as it follows a slow process that consists of a cycle of actions that are of a different nature and phase. This technology, that has affected economies all over the world and helps in the development process of socio-economic environments, is the backbone for the modern information society (Gökalp 2010). However, while it is ubiquitous and pervasive, the role of technology has also been ever-changing and this is what is discussed next.

The Changing Role of Information Technology

Reddy (2006) state that the definition of educational technology is the systematic application of human and technological resources in the teaching and learning programmes. An application that can be used as a creator, processor, analyser and transmitter of data can be called IT (Reddy 2008). The education sector's aim is to make use of IT as a tool that provides students with information (Reddy 2008).

The traditional classroom method whereby teachers stand in front of students and teach using chalk, eraser and textbook is fast being replaced by information technology (Demirci 2009). In some areas, technology has changed the teaching methods in that teachers do not explain every aspect of each lesson. Therefore, students inquire, and solve problems by accessing information from different sources (Demirci 2009). Technology also introduces a new way of learning and an understanding of different things

which were not clearly understood in class. For example, the use of PowerPoint presentations enables teachers to enhance explanations with graphics that enable understanding and increases the semantic content of the presented material. It also provides students with more knowledge content that improves students' argumentation and problem solving skills. (Reddy 2006; Gökalp 2010; Kaffash *et al.* 2010). Using technology, the development of online educational content repositories is made possible (Kim & Bonk 2006).

Introducing technology in classrooms mixes the views of instructors when it comes to the role of technology (Buerck, Bagsby, Mooshegian & Willoughby 2011). Buerck *et al.* (2011) state that instructions that are online provide a balance between instructors' and online support. Online resources can be developed to support course management tools that come with the IT educational platforms mentioned earlier.

As Teimoornia, Hamidi, Jomeh, and Foroozesh-nia (2011) contend, innovation of schools and services that are provided to community can be done by the contribution of ICTs. They continue that ICT is one of the elements that have played a part in the changes that have been witnessed in the education sector and it is also contributing to the innovation of the existing society. An outcome that stems from education is that IT is shifting the responsibility of learning to learners (Teimoornia *et al.* 2011). They argue that there should be approaches that the education discipline can use to integrate ICT into education systems. These approaches should encourage the use of IT in, among other things, improving students' problem solving and critical thinking skills, learning and understanding of theirs and other peoples' culture, language, and history.

Social Context

According to Lubbe and Bopape (2012) different social settings in organisations makes the use of technology far more complex than technological determinants. They continue by stating that the organisational culture, the environment in which IS operates is mainly examined in social informatics. This field places the social context of a system at its centre. Lubbe and Bopape (2012) state 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. Social context can therefore be

regarded as an interactive relationship between various communities through the use of IS that is simplified for easier use. They further allude that the participation of IS occurs in social context and it is influenced by a variety of practices and some non-technical issues. The process of designing and developing systems has to consider the involvement of present and institutional users (Lubbe & Bopape 2012).

Socio-Technical Approach

Socio-technical method is defined as an approach to design that considers human, social and organisational factors, as well as technical factors in the design of organisational information systems (Baxter & Sommerville 2011). This ensures the capturing of technical as well as the softer organisational aspects of systems. The idea behind socio-technical approach is that the development and design of systems should consider technical factors and social factors that influence the functioning of computer-based systems. Baxter and Sommerville (2011) further describe socio-technical systems as those that involve a complex interaction between humans, machines and the environmental aspects. They identified four key features of socio-technical systems as: Parts that depend on each other should be included in systems, external environmental goals should be adopted by systems, there exist different design options, so systems are able to achieve their goals and the performance of a system depends on social and technical subsystems. In developing socio-technical systems, Baxter and Sommerville (2011) recommended the formative approach as a method because it can predict the types of functions a system can do.

User Acceptance

Ellis, Hughes, Weyers and Riding (2006) describe learning technologies as a technology tool that is used to assist students in achieving their educational goals. They note that these technologies are used as a part of a teaching approach. They also note that learning technologies introduced a way in which students can interact with learning on-line and emphasize that these technologies' function is to help solve problems in time and distance.

Certain technologies are focused on learning and some are focused on improving other existing technologies for different purpose than learning (Ellis *et al.* 2006). By introducing learning technologies to universities, it

brings a whole new experience on learning and teaching (Ellis *et al*. 2006). According to Van Raaij and Schepers (2008), for a virtual learning environment to become accepted and used, it depends on the extent at which students accept and use the e-learning systems.

With distance and time between students and their learning facilities, a digital system may assist with educational courses (Van Raaij & Schepers 2008). They wrote that educational courses become successful depending on how students accept and use e-learning systems. People's intensions influences the behaviour on how they will accept a system, these will show how willing people are to try and use the systems.

They also argue that an attitude can be defined as a person's negative or positive evaluation of performing the target behaviour. The attitude of any individual towards something influences the behaviour of that individual towards the use of new technology (Van Raaij & Schepers 2008). They state that the functionality of the new technology can trigger the intensions of an individual to use that new developed technology. Some individuals are not willing or encouraged to try out new technology because they are afraid: to look stupid, of losing important information, or making mistakes (Van Raaij & Schepers 2008). The reuse of knowledge gathered from other familiar systems can encourage users to adopt a system. The discussions above have highlighted several issues that are pertinent to the adoption of e-learning systems in organisations. Using this discussion as a lens, questions may be answered while investigating the adoption and use of these systems at NWU, Mafikeng Campus.

Research Questions

The social impact of IS still remains a vital but grey issue. The following are issues that will be discussed in this paper.

- To what degree were the users of the NWU Mafikeng Campus IS involved during the adoption of the e-learning systems.
- To what degree did they participate in the development and/or implementation of these systems?
- How can user involvement and participation be related to IS success?
- What kind of social factors should be an influence to the development of IS?

These questions will be addressed below but first the paper will address the research methodology adopted for this study.

Research Methodology and Design

Buerck *et al.,* (2011) describe social informatics as a research study that focuses on the relationship among the ICTs and their existence in a social context. This research study looks at how involved humans are during ICTs development. The questionnaires used consist of three parts. Part one is the permission to use the response, part two is about personal details of the student and part three focuses on the social impact of information systems at a tertiary institution. These questionnaires were filled by students who are doing their honours in the Faculty of Commerce and Administration at the Mafikeng Campus of North West University.

Population and Sample Size

The population for this study consisted of honour students of the FCA at NWU. The sample included students who are doing honours and use the NWU information systems to help them with their research and other modules. And this study focuses on those who can be able to give the relevant answers. The sample size consisted of 113 honours students' of the Faculty of Commerce and Administration who did their honours degree in 2011. The students were selected because they could easily be reached resulting in cost and time. The data was collected through questionnaires. The questionnaires were given to honours students as a hard copy because it was easier to hand out as well as collect them. The data was summarised on a statistical spreadsheet and analysed through the use of Excel.

Data Analysis

This section discussed the Respondents' biological data such as gender, age, marital status, highest qualifications, years of service and occupational status is individually presented.
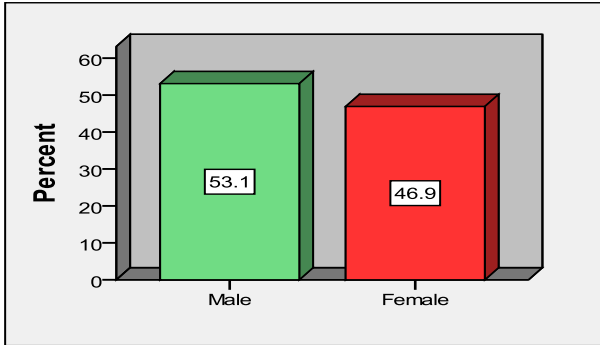
Figure 1 Gender of respondents

The study did not limit the respondents to only males or only female. The figure above shows that the study has more male respondents (53.1%).
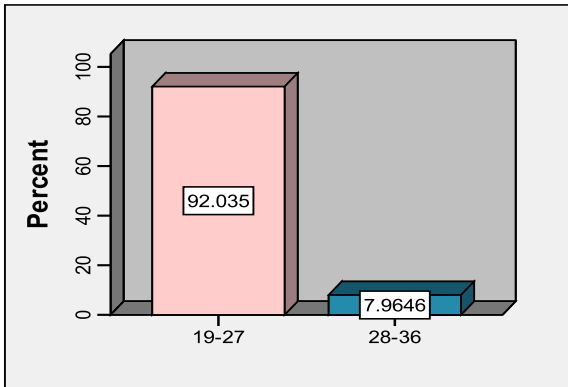
Figure 2 Age groups

For the successes of IS, it is important to include the age group that falls within the younger generation because they show more interest in IS than other age groups. Figure 2 reveals that the most dominated age group (19-27) is 92.04%. Hence the result of measuring and rating the IS of NWU can be used to produce guidelines best for the development of IS in future using this group.

Cross Correlation

The results are summarised below.

Table 1 Gender and age group Cross tabulation

			Age group		Total
			19-27	28-36	
Gender	Male	Count	53	7	60
		Expected Count	55.2	4.8	60.0
		% within Gender	88.3%	11.7%	100.0%
	Female	Count	51	2	53
		Expected Count	48.8	4.2	53.0
		% within Gender	96.2%	3.8%	100.0%
Total		Count	104	9	113
		Expected Count	104.0	9.0	113.0
		% within Gender	92.0%	8.0%	100.0%

There is a relationship between gender and age group although this relationship is different from age group to age group. In Table 1 more males (55.2%) are aged between 19 and 27 years. This means that younger users should be part of development groups. Chi square tests were carried out to find out whether there were certain IS that some respondents knew more off. Pearson's and the likelihood chi square tests are shown as 2.392 and 2.546 respectively.

Table 1 Chi-Square tests

|	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.392[a]	1	.122
Continuity Correction [b]	1.436	1	.231
Likelihood Ratio	2.546	1	.111
N of Valid Cases	113		

Their corresponding probabilities are 0.122 and 0.111. Comparing these probabilities with the 5% significance level leads to the acceptance of the null hypothesis that there is no association between gender and age groups of respondents when it comes to the development of IS.

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Table 2 Awareness of NWU IS

	Frequency	Percent	Valid Percent	Cumulative Percent
University website	38	33.6	33.6	33.6
eFundi	42	37.2	37.2	70.8
Groupwise	20	17.7	17.7	88.5
All the three	12	10.6	10.6	99.1
eFundi and Groupwise	1	.9	.9	100.0
Total	113	100.0	100.0	

Technologies can be applied in many ways such as improving learning in universities and to modify existing technologies used for teaching (Ellis *et al.* 2006). The introduction of learning technologies in universities introduces a new experience on learning and teaching (Ellis *et al.* 2006). Hence when students are aware of the systems they can make their learning much easier. Most of the respondents were aware of more than just one IS.
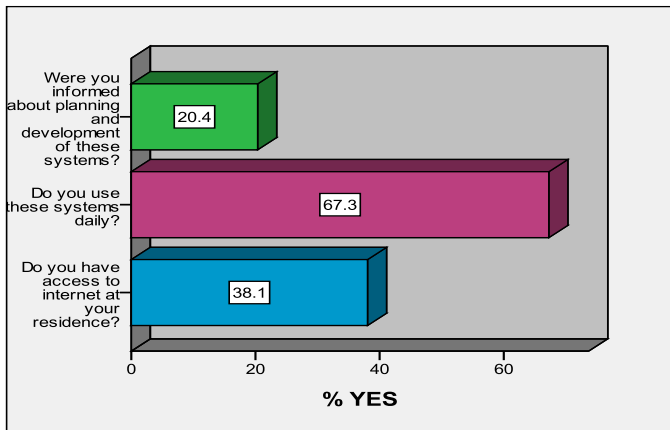
Figure 3 Responses to question as listed on the figure

Van Raaij and Schepers (2008) state that the behaviour of a person can encourage that person to try new technology. A system's functionality can influence a person to make use of technology elements (Van Raaij & Schepers 2008). Students use the university IS because the functionalities help them in their studies. Figure 3 shows the respondents reaction to the questions. As a result, respondents use the systems daily.

Table 4 Knowledge of using these systems

	Frequency	Percent	Valid Percent	Cumulative Percent
A little	23	20.4	20.4	20.4
A lot	48	42.5	42.5	62.8
Very good	41	36.3	36.3	99.1
No	1	.9	.9	100.0
Total	113	100.0	100.0	

The importance of knowledge can be measured on how NWU IS is satisfactory for its users. Table 4 shows that 36% of the respondents know well how to use these systems. The result shows that respondents can use these systems.

Table 5 Primary method of accessing these systems

|	Frequency	Percent	Valid Percent	Cumulative Percent
At home	4	3.5	3.5	3.5
At NWU	93	82.3	82.3	85.8
At work	12	10.6	10.6	96.5
Internet cafe	1	.9	.9	97.3
At home and NWU	3	2.7	2.7	100.0
Total	113	100.0	100.0	

Table 5 indicates the method of accessing these systems; 3.5% of the respondents access them at home, 82.3% of the respondents access them at NWU and 10.6% access it at work, 9% access them at an Internet café.

Table 3 Involvement in planning and development of IS

	Frequency	Percent	Valid Percent	Cumulative Percent
Not at all	101	89.4	89.4	89.4
At the beginning	8	7.1	7.1	96.5
At the end	4	3.5	3.5	100.0
Total	113	100.0	100.0	

Gökalp (2010) states that there are two components that are found in the system development participation, user involvement and user participation. They note that user participation is referred to the user behaviour, assignment and activities that users contribute to the development of a system. Also user involvement is referred to as a subjective psychological state reflecting the importance and personal relevance that a user attaches to a given system (Gökalp 2009). When users are included during development and implementation of systems they can use it.

Table 6 shows that 89% of the respondents were not involved in the planning of the NWU IS. It can be concluded that the IS reflect bad on social relationship of the users. Users need to participate in the planning and development.
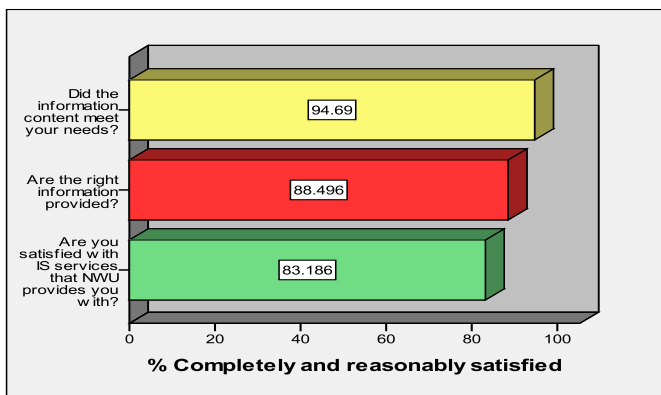
Figure 4 Response to satisfaction

Reddy (2008) note that when the IS management is effective, the outcome of this was that the users respond positively on satisfaction on the usage of the system and show a better level performance on IS. This means that when the IS provide users with the right information the users are satisfied about the information they are getting from the IS and they are also satisfied with the IS services that NWU provides the students with. Figure 4 reveals that 94.69% of the respondents confirm to be reasonably and completely satisfied that the IS content meet needs.
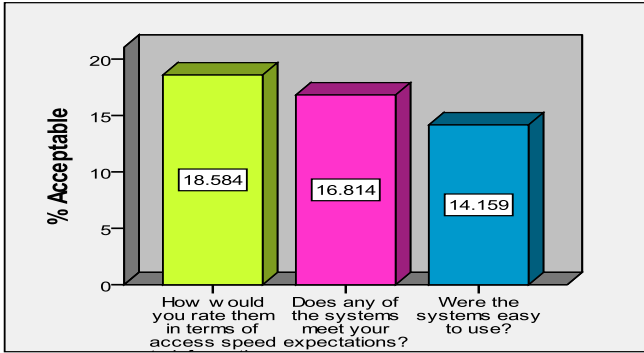

Figure 5 Responses to questions as listed in the figure

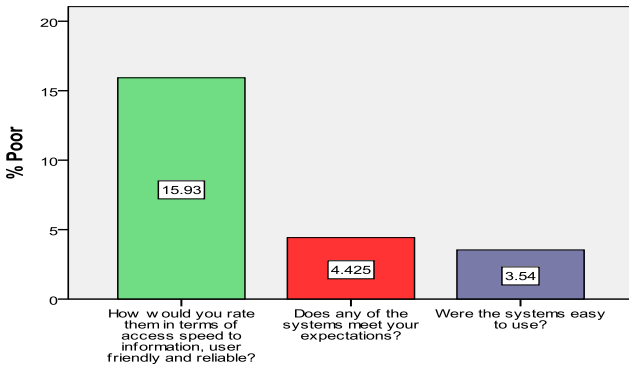Respondents confirmed that the rate of speed is acceptable.

Figure 6 Response to question listed in the figure

Figure 6 indicates that 15.93% of respondents confirm that the systems are poor in terms of access speed.

Table 4 Satisfaction of IS services that NWU provides

	Frequency	Percent	Valid Percent	Cumulative Percent
Completely satisfied	5	4.4	4.4	4.4
Reasonably satisfied	89	78.8	78.8	83.2
Not satisfied	16	14.2	14.2	97.3
Completely unsatisfied	3	2.7	2.7	100.0
Total	113	100.0	100.0	

Table 7 shows that only 4.4% of the respondents are completely satisfied while 78.8% of the respondents are reasonably satisfied. This indicates that most respondents are just reasonably satisfied with IS services that NWU provide.

Table 5 Rating of NWU systems in terms of access speed to information, user friendliness and reliability

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Poor	18	15.9	15.9	15.9
	Good	69	61.1	61.1	77.0
	Excellent	5	4.4	4.4	81.4
	Acceptable	21	18.6	18.6	100.0

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Poor	18	15.9	15.9	15.9
	Good	69	61.1	61.1	77.0
	Excellent	5	4.4	4.4	81.4
	Acceptable	21	18.6	18.6	100.0
	Total	113	100.0	100.0	

Reddy (2006) writes that how IS perform can be determined by capabilities that it provide the organisation with when making decisions. They state that IS quality plays an important aspect when IS elements are evaluated. The benefits of IS elements play a role when the IS is providing them with services (Reddy 2008).

On this question, respondents were asked to indicate how fast or slow do the systems work and their user friendliness. They had to rate them on whether they were poor or good, but the level of rating is high on the rating that the systems were actually good. The table above shows that 15.9% of the respondent's rate the access speed to information as poor while 61.1% of the respondents rate it as good.

Table 6 Right information met user's needs

	Frequency	Percent	Valid Percent	Cumulative Percent
Completely satisfied	7	6.2	6.2	6.2

Reasonably satisfied	93	82.3	82.3	88.5
Not satisfied	9	8.0	8.0	96.5
Completely unsatisfied	4	3.5	3.5	100.0
Total	113	100.0	100.0	

The table indicates that 6.2% of the respondents are completely satisfied with the information that the systems produce, 82.3% indicated that they are reasonably satisfied, 8.0% indicated that they are not satisfied and 3.5% indicated that they are completely unsatisfied with the information that the systems produce.

Table 7 User's systems expectations met

	Frequency	Percent	Valid Percent	Cumulative Percent
Poor	5	4.4	4.4	4.4
Good	83	73.5	73.5	77.9
Excellent	6	5.3	5.3	83.2
Acceptable	19	16.8	16.8	100.0
Total	113	100.0	100.0	

The table above shows that 4.4% of the respondents indicate that the expectations of the systems have been poorly met, 73.5% indicate that their expectations are met.

Davenport (2008) explains voluntary involvement of users as a principle that users have towards a system being developed that their participation is personally relevant and important. The users who volunteer may be interested in the development of certain systems being developed. Van Raaij and Schepers (2008) state that an individual can be willing to try new improvement and that person can be said that he or she is a theoretical risk taker. Nearly thirty nine percent of the respondents are willing to be involved a little while 43.4% of the respondents are willing to be involved a lot. Therefore, it shows that most respondents are willing to be involved.

According to Lubbe and Singh (2009), the knowledge that users have can improve the quality of IS because the IS will consist of functions that are needed for certain systems. User knowledge refers to how users understand technical factors of system so that when the systems are being developed the user's contribution can be precise towards system development (Lubbe & Singh 2009). The question required knowing how respondents felt about their opinions; whether they think their input is worth value on the quality improvement of the NWU IS. The results show that 45.1.9% of the respondents think their opinion would improve the quality of the IS a little, 50.4% think their opinion would improve the quality of the IS a lot. Therefore, it shows that most respondents think their opinion would improve the quality of the IS.

The next question investigated the kind of problems respondents could have when using these systems. The systems are not fully non-problematic, 53.1 % of the respondents indicate that they have experienced little problems when using the systems, whereas 19.5% have experienced lots of problems. IT has changed on how teaching can be done today and this technology is utilised for teaching. Therefore, students solve problems by accessing information on different problems (Demirci 2009). This question wanted to establish the satisfaction of information that users receive when they use systems. The results show that 8% of the respondents are completely satisfied while 86.7% are reasonably satisfied.

Some users are not willing to try new technology because they are afraid of being seen as stupid, losing important information, or making mistakes. This is in agreement with Van Raaij and Scheepers (2008). This is the case when a user was not involved in the development and implementation of these systems. The outcome reveals 75.5% shows that the

systems are easy to use. Almost 58% of the respondents would like the systems to be redesigned/modified a little.

Lubbe and Bopape (2012) state that computer literacy is the user's level of understanding as well as knowledge that they have concerning the use of computers. They note that if users have knowledge about computers, it would make it easier for the developers and users to communicate and users would understand several computer abbreviations and terms. They also argue that if users are computer literate, they would understand which functions of a system can be developed. In this study most of the respondents are advanced users and they responded positively of how a system addresses their needs and how fast the systems are. Thirty-four percent of the respondents responded they were skilled while 52.2% responded were advanced.

Lubbe and Singh (2009) state that IS is seen as a tool that can help the users to carry out certain work. When the work of the user's increases, they have a positive reaction on IS functionalities. User satisfaction can therefore be achieved when the number of support users need from IS is in line with IS planning and services (Lubbe & Singh 2009). They note that dissatisfaction of users can be seen when there is not enough support from IS. More than 73% of the respondents were satisfied of how the systems address their social needs. Respondents showed that 56.6% use efundi and 41.6% use Groupwise.

Measures of Association

There is relationship between IS and access to Internet. Amongst the people who have access to Internet, 50% use it to access university website, 26.2% for efundi, and 25% represents those who use it to have access to GroupWise. Though some students use the Internet for efundi or Groupwise individually, some of them collectively use the Internet to have access to both efundi and Groupwise. The Pearson and Likelihood ratio tests results show the critical value of these statistics at 5% level of significance and 4 degrees of freedom is 9.488. The test statistics for these two tests are 9.975 and 10.361 for Pearson and Likelihood ratio respectively. Since these test statistics are greater than the critical value, the null hypothesis that there is no association between IS and access to Internet is rejected.

Table 11 Measures of association

		Value	Approx. Sig.
Nominal by Nominal	Phi	.297	.041
	Cramer's V	.297	.041
	Contingency Coefficient	.285	.041
N of Valid Cases		113	

As shown in Table 11, three association measures have coefficients of 0.297 and 0.285 for Phi, Gramer's V and Contingency coefficient respectively. The measure of association with a coefficient ranging between 0.1 and 0.3 implies that the association/relationship between the variables is weak. According to Reddy (2006), IT is a tool which can be utilised to create, process and analyse data and it can be a tool that the education sectors can make use of in schools and universities to provide students with information and this study does not support it.

In all respondents that use the systems daily, 71.1% uses the university website, 64.3% uses efundi, and 85.0% uses Groupwise. The Pearson and Likelihood ratio tests have a critical value at 5% level of significance and 4 degrees of freedom of 9.488. The test statistics for these two tests are 10.034 and 10.250 for Pearson and Likelihood ratio respectively. Since these statistics are greater than the critical value, the null hypothesis that there is no association between IS and the daily use of the systems is rejected.

Table 12 Measures of association

		Value	Approx. Sig.
Nominal by Nominal	Phi	.298	.040
	Cramer's V	.298	.040
	Contingency Coefficient	.286	.040
N of Valid Cases		113	

As shown in Table 12, two association measures have coefficients of 0.298 and 0.286 for Phi, Gramer's V and Contingency coefficient respectively. According to the measure of association, a coefficient ranging between 0.1 and 0.3 entails that the relationship/ association between the variables is weak. This means that there is weak association between IS and the daily use of the systems. So the NWU IS is being used daily and this can increase the success of the systems.

There is little relationship between IS and the informing of planning and development of IS. Amongst the people who were informed of planning and development of IS, 18.4% indicates that they were not informed at all on the university website, 23.8% indicates that they were not informed at all on efundi, and 15.0% indicate that they were not informed on Groupwise.

Reddy (2008) note that in the process of IS development, end-users involvements can be useful because end-users provide better specifications and requirements making sure that the relevant systems are developed. The results show there is a relationship between IS and the involvement of planning and development of IS. Amongst the people who were involved in the planning and development of IS, 89.5% indicates that they were not involved at all on university website, 88.1% indicates that they were not informed at all on efundi, and 95.1% indicate that they were not involved on Groupwise.

Table 13 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	29.627[a]	8	.000
Likelihood Ratio	10.164	8	.254
N of Valid Cases	113		

Table 13 indicates the Pearson and Likelihood ratio tests results. The critical value of these statistics at 5% level of significance and 4 degrees of freedom is 9.488. They both tested 29.627 and 10.164 for Pearson and Likelihood ratio respectively. The test statistics resulted in greater value than the critical value, therefore the null hypothesis reveals that there is no association between IS and the informing of planning and development of IS then it is rejected. It is then concluded that there association between these two variables as also shown.

Conclusion and Managerial Guidelines

In previous sections of the paper it has been pointed out that the study falls within the field of Social Informatics. In a community, IS can be difficult to use. Therefore, the study focused on finding guidelines that would involve the community to be part of the development of IS.

The study looked at the present systems that NWU has and how these systems affect students. The systems were developed and implemented without the input of users. The research questions were used to find out how the community is affected by these systems and whether they were involved and if they would want to participate in future developments of NWU IS.

Summary of the Project

Technology replaces certain activities and many people are exposed to the changes that technology brings (Lubbe and Singh 2009). The results of this is that IS has expected and unexpected implications on users including social

environment. Most organisations are exposed to IS and it has become one of the most important tools that can help students and lecturers do their work. It has become difficult for users of IS to interact with these systems because they were not included in the development of the systems. User participation can play a role in the development of IS because developers can identify what the user's needs are and how they can reach those needs. To a certain extent, some users are willing to be involved and they feel that their input can add value.

The NWU IS that were investigated are, efundi (used as a communication tool as well as for electronic learning), Groupwise (used for communication) and the University Website (used for many things such as searching for books, accessing the university library and finding articles for research purposes).

Amongst other things discussed in the literature review was the involvement of users as well as the participation of users in the development of IS. It highlighted the importance of user participation and involvement during the development and implementation of IS. It also discussed the downfalls of user involvement and participation in IS development being that some users do not actually know what they want and sometime they want certain functions that are not necessary for a certain systems. The next section addresses the research questions raised above.

What is the Impact of IS Within NWU?

Lubbe and Bopape (2012) note that using IS as a communication tool affects the social relationships of those using it. Also, these systems assist the users with their studies. The results indicates that 82.3% of the respondents access these systems at NWU; this means that most of the respondents do not have Internet access to access these systems at their homes or residences and they need to access the system to get study materials, information of next classes, tests or quizzes and communicate with their classmates or lecturers.

To what degree are the users of the NWU Mafikeng Campus IS involved and participate in the development and/or implementation of these systems?

User participation is referred to as the user behaviour, assignment and activities that users contribute to the development of a system. User involvement is referred to as a subjective psychological state reflecting the

importance and personal relevance that a user attaches to a given system (Teimoornia *et al.* 2009). In the results it is indicated that 89.4% of the respondents were not involved and/or even participated in the development and/or implementation of the NWU's IS at all.

As a result, user involvement is required but it seems that users of the current NWU systems were not involved or those who were involved did not contribute to a full extent. If the users that were involved had given much input, the systems were not going to cause too much impact on the users that are currently interacting with them. Users were forced to accept the systems as they are because they cannot be change and most users were willing to be involved if the systems were to be modified or changed.

How can user involvement and participation be related to IS success?

Lubbe and Bopape (2012) state that if IS's success can be measured by user participation and satisfaction in the development of systems, then IS's success relates to user and it would mean that user participation is necessary for IS's success. User involvement and participation can be related to IS in terms of the success of systems. The success of IS is not just determined by the developers but also its users. To measure how IS relate to user involvement and participation the satisfactions of users can be determined therefore to show that they relate to measure the success of IS. The results show that 78.8% of users are reasonably satisfied with the IS services that NWU provide. As a result, the IS of NWU is reasonably successful although they were not involved.

What kind of social factors should be an influence to the development of IS?

The following are the characteristics that users have which can influence the success of the systems when they are being developed: User participation, user involvement, user willingness and user's computer literacy. User participation is described as the participation of users that is active and substantive towards the process of development. User involvement can be described as considering the inputs and suggestions of potential user of the system during their development process.

User willingness is defined as users that would like to be part of the development process and they know that their inputs can add value on the system's success. The results indicate that 43.4% of the respondents are willing to be involved in the development of NWU IS. This shows that not a lot of users have the interest to be involved and make a difference concerning NWU IS. User's computer literacy is described as the user's level of understanding as well as knowledge that they have concerning the use of computers (Lubbe & Bopape 2012). The results show that 52.2% of the respondents are advanced regarding the use of computers. Table 4.18 shows that 73.5% of the respondents are satisfied that the IS is addressing their social needs.

Guidelines
The guidelines that follow are given to tertiary institutions that plan to develop and implement IS or they have IS as a tool that students and lecturers can use:

- Based on these results, it indicates that only 73.5% of the respondents regard the systems as good and 5.3% regard them as excellent. It can only mean that the needs of users were not considered. In this case the guideline would be that even if the users do not understand, their needs should be taken into consideration.
- The theory state that social context can be stated as an interactive relationship between various communities through the use of IS that is simplified for ease of use. Therefore, the IS that users use affects their social aspects therefore when these systems are to be implemented, the impact should be taken into account
- Lots of users are willing to participate and they feel that their input can be worth more value in the development and implementation of IS when it is built for their use. This guideline is supported by the results which indicate that 43.4% of the respondent are willing to participate a lot and 38.9% of the respondents indicates that they are minimally willing to participate in the development and implementation of the systems
- For the IS to be successful it would require the users to participate and be involved positively in IS development and implementation. Based on the theory the involvements of end-users provide accurate

specifications and requirements to make sure that the relevant systems are developed and provide user ownership in IS and promote empowerment. This means that the involvement of user can result in the success of IS.

- The use of best practice is not enough; therefore the needs of the users have to be taken into account. It is important to know how the user requires the system to function; the theory explains that end-users can provide accurate specifications and requirements for a system.

- The theory state that the classroom method whereby teachers stood in front of students has been changed by technology. This means that effectiveness of IS is one of the things that add value to education, but it has the ability to impact enormously on the community that uses it. As a result, before the implementation of whichever IS this should be taken into consideration.

Conclusion

The study's focus was to investigate social impact of IS at NWU. In the investigation, the most vital parts were investigations on the user involvement and participation. The two can help to measure the success of systems because they provide inputs that are necessary for the functions of any system that can be developed and implemented.

It can be concluded that IS has an effect on social relationships because it has the power to change how other relationships are structured because they use these system. The relationships include peers, students, lecturers and friends. Most users were reasonably satisfied with the current systems but in future their needs should be considered as well as their inputs when developing and implementing new or upgraded system.

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