THIRD-YEAR STUDENTS' PERCEPTIONS OF THE USE OF ICT AT A TEACHER TRAINING COLLEGE IN NAMIBIA

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DECLARATION

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SUMMARY

The use of ICT to enhance the quality of student learning is generally observable in higher education institutions. The adoption of ICT policy for education in Namibia in 1996 has profoundly encouraged the use of ICT to enhance student learning at teachers training colleges, in particular Caprivi College of Education. Although ICT has positioned itself in higher education, its implementation to enhance student learning has been received with mixed feelings, attitudes and perceptions among students.

The use of ICT in relation to learning paradigm, collaborative and/or co-operative learning, deep learning approach and assessment seem to be problematic among students and may affect their learning. Issues related to access to ICT, ICT skills and support (technical and service) contribute to students' negative perceptions towards the use of ICT in learning.

The purpose of this study was to investigate students' perceptions of the possible effect of ICT application on student learning at Caprivi College of Education in order to determine the ICT skills and learning strategies student teachers use to enhance their learning.

The research strategy for this study was a quantitative survey. Quantitative data was obtained by administering closed-ended questionnaires to third-year student teachers at Caprivi College of Education. The study concludes that student teachers overwhelmingly perceive the use of ICT to enhance their learning in various ways.

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DEDICATION

This thesis is dedicated to my late father, Kenneth Mukelabai Chainda whose set

target I aim to achieve.

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LIST OF ACRONYMS

BETD	Basic Education Teachers Diploma
ETSIP	Education and Training Sector Improvement Programme
ICT	Information Communication Technology
ICTED	Information Communication Technology Standards for Educators
IMTE	Integrated Media and Technology Education
MBESC	Ministry of Basic Education, Sport and culture
MEC	Ministry of Education
Net Gen	Internet Generation
NIED	National Institute for Educational Development
NPST	National Professional Standards for Teachers in Namibia
SwC	Studying with Computers
SBS	School Based Studies
TLM	Traditional Learning Methods
WebCT	Web Course Tools
WWW	World Wide Web

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CHAPTER 1

BACKGROUND AND STATEMENT OF THE PROBLEM

1.1   Background

The application of Information Communication Technology (ICT) is not only emphasised in corporative business and the industrial sector, but it is an essential part of education at all levels. In 2006, the Ministry of Education in Namibia approved an ICT policy for education (Ministry of Basic Education, Sport and Culture (MBESC),1996) and set up national policies such as the National Professional Standards for Teachers in Namibia (NPST) and Information Communication Technology Standards for Educators (ICTED) which clearly outline the expected outcomes for teachers in the country. ICT, including computers, is generally believed to foster cooperative learning, provide more information and, through simulation, make complex learning experiences easier to understand. Therefore the use of ICT cannot be ignored either by teachers or by students. This sentiment is stressed by Van der Westhuizen (2004) who points out that, in relation to the use of ICT for learning, technology holds a promise of improved access to information and increased interactivity and communication between teachers and their students.

The national policies mentioned above coupled with cooperative learning strategies, student-centred learning, technological environments and demands of new learning paradigms have paved the way for teacher education institutions to apply ICT to enhance the quality of student learning. Despite the benefits of ICT, using it to enhance student learning raises concerns about "managing learning and engaging learners in appropriate learning activities" (Biggs, 2003:214-215). Students' perceptions regarding the use of ICT need to be investigated to establish how ICT enhances student learning. Perception is defined as "a belief

or option, often held by many people and based on appearance" (Cambridge International Dictionary of English, 1995:1047). In this study, perceptions refer to third-year students' beliefs, attitudes, opinions and feelings towards the use of ICT in their learning.

This study was carried out at the Caprivi College of Education situated in the town of Katima Mulilo in the far north-east of Namibia. The Caprivi College of Education is one of the four teachers' colleges in Namibia tasked by government to train pre-service teachers to teach the school curriculum from grades one to ten, referred to in Namibia as basic education.

1.2   Rationale for and significance of the study

Hoyle (1993) states that the introduction of ICT into education was hailed as a major catalyst of the long dreamed-about education evolution. The implementation of ICT in learning dates back to the early 1960s (Offir, Golub & Friedel, 1993 in Katz, 2002:2) with the introduction of Computer Assisted Instruction (CAI). Fry, Ketteridge and Marshall (1999) and Katz (2002) have stated that CAI was rigid and practised by teachers to drill students, thus it led to the evolution of spreadsheets, databases, simulations and multimedia. Jones and Knezek (1993:246) point out that the introduction of ICT in education is a "major vehicle to improve the efficiency" of the educational process and increasing its efficiency implies that educational technology must guide learners through the curriculum, learning strategies and curriculum assessment practices. Katz (2002) quotes several authors (Offir & Katz, 1994; Dreyfus, Feinstein & Talmon, 1997 and Apple, 1997) who seem to agree that the learning vehicle called ICT, if used effectively in education, might enhance students' deeper learning.

Flecknoe (2002) also indicates that ICT assists students to learn. This includes the use of web-based teaching, internet facilities, ICT skills programmes,

simulations and generic tools such as word processing, Excel, presentations and databases which are all designed to provide students with wider experiences than they would have had with dependence on what the teacher knows.

To further justify the use of ICT in learning, Twinning (2001) stresses that teachers have an obligation to help students to become more exposed to ICT facilities. This may help students to develop competencies like technology literacy, information literacy and visual literacy, which have become necessary skills for citizens in an Information Age (MBESC, 1996), the implication hence being to develop the skills which will be used to understand the curriculum and enhance students' approaches to learning. Roblyer (2003:45) affirms the revolutionary ICT move into education by emphasising a shift in teaching and learning practices (traditional teaching to student-centred teaching) of such a nature that, when teachers apply technology in their teaching, it results in students' "cooperative learning, shared intelligence, problem solving and developing higher order skills" (Gülbahar, 2008:32). These elements may comprise the basic building blocks towards the learning success of many students.

In my eight years as an educational technology educator, I have continuously asked myself whether my students learn better now that they are exposed to technology. In other words, given the importance of access to technology, technology-related competencies and their integration into the curriculum, one tends to question whether students perceive ICT as appropriate to improve learning strategies and, eventually, the quality of learning? Coutu, Alway and Lowell (2002:325) lament that "students' sense of their learning in relation to technology is an important venue for understanding how technology impacts on education". Therefore the question I have continuously posed to myself might be worth investigating.

My interest in this research stemmed from my occupation as a college teacher and being responsible for educational technology in teacher training drove me to pursue the investigation into issues related to ICT in education. Smith and Oliver (2002:237) agree that, if innovation in ICT is to be successful, academics need a better understanding of ICT and the discourses involving learning with technology.

1.3 Statement of the problem

If educational technology is viewed as a "major catalyst of a long dreamed educational revolution" (Hoyle, 1993:9) and "a vehicle for educational efficiency" (Jones & Knezek, 1993:246) its positive effects on student learning should be observable in educational institutions. Instead, the observable trend in our educational institutions is, amongst others, low throughput (Garnett & Pelser, 2007) associated with poor student work (assignments, tasks, projects and research papers), plagiarism and dependency on the teacher for resources. A survey on the use of ICT in Namibia carried out in 2006 by the Indian High Commission to Namibia indicated that few teachers were computer literate; teacher training had not been adequately emphasised; and there was little evidence of incorporation of computers and the Internet in the learning process (Information Technology in Namibia: a project of the high commission of India to Namibia 2006).

As an ICT teacher, I believe that this has an impact on the way students learn and that this opens avenues for rich debate. Schunk (2002:187) states that many teachers who offer learning experiences using ICT merely "repackage" the learning offerings so that they are available in electronic form, implying that these teachers have not shifted to the new learning paradigm commonly referred as social constructivism. This poses the all important question of how the dream of active student involvement in learning will be realised if students are passengers in the ICT vehicle. Being a passenger connotes that you are not in control of the

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vehicle, implying that students can be taken in any direction depending on ICT application by the teacher. It therefore seemed important to investigate the perceptions that students hold of ICT and the value of ICT in their learning.

The aim of the study thus was to investigate students' perceptions of the possible effect of ICT use on their learning in one teacher Education College in Namibia. Suggestions, findings, conclusions drawn and implications pointed out in this study may be helpful in the use of ICT to enhance student learning at the Caprivi College of Education.

1.4   Research question

In order to achieve the aim of the study and in consideration of the problem as outlined above, the main research question for this study was:

What are third-year students' perceptions of the effect of the use of ICT on their learning?

The answer to this central question was sought in this study through finding answers to the following subsidiary questions:

- What perceived ICT skills do third-year student teachers at the Caprivi College of Education possess?

- What perceived purpose(s) are ICT skills used for as viewed by third-year student teachers at the Caprivi College of Education?

- What perceived learning strategies do third-year student teachers at the Caprivi College of Education adopt while using ICT?

- Do gender and age play a role in third-year students' perceptions of using ICT in learning?

1.5   Research methodology

To address the research question, a study comprising both non-empirical and empirical research was conducted. The empirical part of the study consisted of a student survey using descriptive data, whereas the non-empirical part consisted of a literature review on Namibia's ICT policy for education, the use of ICT in education, student learning approaches (strategies) and learning theories.

A non-experimental design using a limited survey and employing closed-ended questionnaires was used in this study. Questionnaires were administered to 120 third-year student teachers at the Caprivi College of Education to investigate how they perceive the use of ICT on their learning. Both Likert-type and single-choice type responses were rendered for students to rank themselves regarding their perception of their own ICT abilities. A census sampling (Muijs, 2004:38) of 130 third-year student teachers was used for collecting data. One hundred and twenty questionnaires were distributed and seventy-three questionnaires were returned by participants.

Ethical considerations were observed by ensuring that ethical guidelines were adhered to at all times while humans were involved in the study. Informed consent, voluntary participation, the right to withdraw from the study and the right not to answer question(s) and ethical statements were explained to student teachers. Student teachers were also briefed on the purpose of the study and, inter alia, the data collection procedures prior to administering the questionnaires. Data was analysed using Statistica computer software and by consultation with an expert statistician at the Centre for Statistical Consultation at Stellenbosch University.

1.6   Locating the study

As the empirical part of the study was of a quantitative nature using numerical data and employing statistical procedures (Creswell, 2009) it was mainly positioned within a post-positivist worldview. As the study concentrated on the perceptions of the use of ICT on student learning in higher education, it was also positioned within the ambit of higher education studies as a field of inquiry.

1.7 Definition of terms

Assessment	Is a process to determine what students can do, making inferences and estimating the worth of their actions.
Blended Learning	Learning that employs multiple strategies, methods and delivery systems by combining best features of online and classroom teaching.
Chat room	A location on the Internet set up to allow people to converse in real time by typing in messages or allowing their avatars to meet and talk to each other.
Computer Assisted Instruction	Instruction delivered directly to students by allowing them to interact with lessons programmed into the computer system.
Co-operative learning	The utilisation of (usually smaller) learner-groups in order to enable students to maximise their own learning and that of others.

Educational technology	Information technology applied to serve educational purposes, namely to improve the quality of instruction and outcomes of learning.
Electronic Mail (e-mail)	Messages sent via telecommunications from one person to one or more other people.
ICT	All technologies used for the handling and communication of information and their use specifically in education.
Information technology	Technology such as the computer used to gather, manage and disseminate information.
Internet	World wide electronic communication network with which the computer is the facilitating tool.
Perception	A belief, attitude, opinion or feeling often held by many people and based on appearance.
World Wide Web (WWW)	On the Internet, a system that connects sites through hypertext links.

1.7   Chapter layout of the study

In Chapter 2, the conceptual framework is outlined by means of reviewing literature on Namibia's ICT policy for education, the use of ICT in learning, student learning approaches (strategies) and learning theories. Chapter 3 presents an in-depth description of the research process, research design and methodology that was followed in the study. Chapter 4 presents the data from the empirical study, provides an analysis of the data and reveals findings from the

study. In the last chapter (Chapter 5), the findings are discussed in relation to the literature and a number of conclusions are drawn from the study. It also provides a brief discussion of the limitations encountered in this study and points out the implications of the use of ICT in the learning of college students at the Caprivi College of Education.

The chapter that follows will provide a conceptual framework based on the literature reviewed for this study.

CHAPTER 2

LITERATURE REVIEW

> *"Let the main object of this, our didactic, be as follows: to seek and to find a method of instruction, by which teachers may teach less, but learners may learn more" (John Amos Cornelius, a 16th century scholar, cited in Lust 1969:53).*

Introduction

In modern day education it seems as if technology is leading change at a rapid pace. One of the results of this rapid change is that too little attention is given to exploring the new forms of teaching and learning made possible by ICT. It is therefore no wonder that authors such as McConnell (2006:172) proposes that research is needed to investigate the ways in which students work in new ICT learning environments. Goktas, Yildrim and Yildrim (2009) add that increasing the quality of teaching and learning is an apparent and important concern for education. Therefore different ways and means of delivering quality education in higher education will and should continue to be explored, examined and used.

In this chapter, I address ICT in education from a higher education perspective and context, specifically its position in pre-service teacher education. Issues such as students' learning approaches, constructivist learning and assessment practices are explored in relation to the use of ICT in education. Namibia's ICT policy in education is also briefly explored because of its relevance to this study.

The study is primarily informed by Manathunga and Donnelly (in Donnelly & McSweeney, 2009:85) who quote the view of Oblinger and Oblinger (2005) that "the aptitudes, attitudes, expectations and learning styles of Net Gen (Internet

generation) students reflect the environment in which they were raised". This implies that learning environments in higher education should meet the needs and expectations of the Net Gen or Internet generation students if learning is to take place. Oblinger (2006) argues that today's students are digital, connected, experiential, immediate and social. Thus, they prefer learning that includes peer-to-peer interaction and engagement and learning resources that are visual and relevant. It is therefore important to investigate and determine the perceptions of students regarding the use of ICT in higher education.

2.1   Brief contextual overview: Namibia's ICT policy for education

The Namibian government values the use of ICT in teaching and learning. As proof of this commitment, the government of Namibia, through ETSIP (the Education and Training Sector Improvement Programme), has committed nearly twenty million Namibian dollars for the integration of ICT in the education sector in the financial year 2006/7 (Ministry of Education (MOE), 2007). This accounted for 20% of the total ETSIP budget, making ICT the largest component of the budget. These funds were meant to "holistically deploy ICT in pre-service and in-service teacher education institutions in Namibia" (ETSIP document, Ministry of Education (MOE), 2007:3) is carried out in phases, with the implementation of the first phase beginning 2006 and running through 2009.

As early as 1995, the Ministry of Education and Culture and the National Institute for Educational Development (NIED) started developing an ICT policy for education. In an attempt to describe ICT, the MOE (2005:4) states that "for this policy, Information Communication Technology (ICT) covers all the technologies used for the handling and communication of information and their use specifically in education".   The development of Namibia's ICT policy for education is supported by national strategic documents and policies like Vision 2030, NDP2, strategic plan for the Ministry of Basic Education (2001 - 2006), the national ICT policy and the draft strategy for the Ministry of Higher Education (MOE, 2005:3-

4). The support stems from using ICT in education to improve the quality of teaching and learning so that Namibian learners are prepared for the world of tomorrow and able to meet the challenges of the 21st century.

2.1.1 Goals of the ICT policy for education in Namibia.

According to the stated ICT policy, the goals set for the use of ICT in education in Namibia are (MOE, 2005:5):

- "To produce ICT literate Namibian citizens
- To produce 21st century citizens with capabilities of working and actively participate (sic) in the new economies and societies that arise from ICT and other related developments.
- To leverage ICT to assist and facilitate learning for the benefit of all learners and teachers across the curriculum.
- To improve the efficiency of educational administration and management from classroom to school level.
- To broaden access to quality educational services for learners at all levels of the education system.
- To set specific criteria and targets to help classify and help categorise the different development levels of using ICT in education."

For the purpose of this study, the focus will be on ICT policy for Namibia in teacher education, specifically at the Caprivi College of Education. ICT policy for education in Namibia views ICT as having greater benefits to enhance the quality of teaching and student learning. The policy outlines the benefits as follows:

- "Offer opportunity for more student centred teaching.
- Give at risk students' greater opportunities e.g. students who have authority figures perceive computers as neutral.
- Greater exposure to vocational and workforce skills for students.

- Greater opportunity for teacher-to-teacher and student-to-student communication and collaboration.
- Greater opportunity for multiple technologies delivered by teachers.
- Greater opportunity for teacher-to-teacher and student-to-student communication and collaboration.
- Greater opportunities for multiple technologies delivered by teachers.
- Creating greater enthusiasm for learning amongst students.
- Access to a wider range of courses (both by subject, level and lifestyle choice).
- Provide teachers with new sources of information and knowledge.
- Preparing learners and students for the real world.
- Providing distance learners country-wide with online educational material.
- Providing learners with additional resources to assist resource-based learning" (MOE, 2005:2).

Namibia's ICT policy for education points out important features related to teaching and learning in higher education. These features include, amongst others, collaboration, student-centred teaching, access and learning resources which are important to improve the quality of learning. The adoption of the ICT policy for education in Namibia makes provision for pre-service student teachers at the four colleges of education in Namibia and the University of Namibia to enjoy top priority in the on-going deployment and training of ICT (ICT in education implementation plan guide, MOE, 2006b). This entails that pre-service student teachers acquire the necessary ICT skills and knowledge to help them learn the curriculum and integrate ICT skills in their teaching career as future professionally trained teachers.

2.1.2 ICT Development Levels

To ensure that students acquire ICT skills and knowledge, Namibia's ICT policy for education singles out development levels for ICT. These development levels

are meant to measure progress in the implementation of ICT in education and address the goals of the policy. The development levels are summarised in Table 2.1 below.

Table 2.1: Development level requirements for Namibia's ICT policy in education

	Level 1	**Level 2**	**Level 3**	**Level 4**	**Level 5**
Classroom facilities	1 room with ICT	At least 1 room with ICTs	2 or more rooms with ICTs	Many rooms with ICTs	Significant number of rooms with ICTs
Display facilities	Audiovisual and/or broadcast facilities	Projector and/or ability to display audiovisual materials	Projector and/or ability to display audiovisual materials	Projector and/or ability to display audiovisual materials	Projector and/or ability to display audiovisual materials
Internet Access	Not necessarily	Yes	Yes	Yes	Yes
Teacher skills: all teachers	Foundation level ICT Literacy Certificate	Foundation level ICT Literacy Certificate	Intermediate Level ICT Literacy Certificate	Intermediate Level ICT Literacy Certificate	Advanced Level ICT Literacy Certificate
Teacher skills: specialized staff	1-2 staff with Intermediate Level ICT Literacy Certificate	At least 2 staff with at least Intermediate Level ICT Literacy Certificate or Higher ICT qualification	At least 30% of staff with Advanced Level ICT Literacy Certificate or Higher ICT qualification	At least 50% of staff with Advanced Level ICT Literacy Certificate or Higher ICT qualification	At least 50% of staff with ICT Dilpoma/Degree (or equivalent)
Learner or student skills	Introduction to ICTs	Foundation Level ICT Literacy Certificate	Intermediate Level ICT Literacy Certificate	Intermediate Level ICT Literacy Certificate	Advanced Level ICT Literacy Certificate
Student access	1 class period per month	1 class period per week	At least 3 class periods per week	At least 1 class period per day	At least 4 class periods per day

Timetabling of ICTs	No	Yes	Yes	Yes	Yes
Communication with parent Ministry via ICT	None	Over 20% done via email	Over 33% done via email	Over 50% done by email	Over 75% done through email and web

(Source: ICT in education implementation plan guide, MOE, 2006b)

The ICT policy for education in Namibia indicates that training facilities for pre-service student teachers should be at level 4. ICT development at level 4 means that:

> "…all students have reasonable access to a computer (better than 1 computer per 5 students/learners), and all staff has access to a computer (1 computer per 1 member of staff with Internet connection. All students are able to use a computer, communicate by e-mail, find information using web-based systems, and create output using a word processor, spreadsheet and presentation software, e.g. assignments. Learning materials are downloaded and created on computers…" (MOE, 2005:7).

The implication of ICT development level 4 for teacher education institutions is that much of the work should be done using technology. Achieving ICT development level 4 is a major challenge for institutions and government. It should be noted that the government of Namibia foresees challenges in the implementation of ICT policy in education (i.e. the government does not see any quick fix programmes) (MOE, 2005:5). By implication, the Namibian government is acknowledging the slow pace and level of ICT deployment and development, despite having well-outlined ICT policies and strategic plans in place. However, emphasis is placed on ICT players in government institutions, partners in education, stakeholders and non-governmental organisations (NGOs) to take a

leading role in the process of deploying and developing information communication technologies.

It seems that the pace at which ICT is implemented, specifically in pre-service teacher training institutions, is slow and unacceptable. According to the ICT in Education Implementation Plan Guide (MOE, 2006b:25) the Caprivi College of Education as of October 2005 had "thirty-six computers which were shared among three hundred and eight student teachers". On average, eleven students share one computer, making the regular use of it quite difficult. As a staff member at the Caprivi College of Education in January 2007, I witnessed the first delivery of twenty client computers, a server, a printer, four electronic whiteboards and four projectors. This improved student access to computers and related ICTs. Since this first ICT deployment in 2007, nothing more of the planned roll-out of computers and related materials to colleges of education in Namibia for the years 2008 and 2009 has taken place. This negatively affects the implementation of the ICT policy in teacher education and, in turn, the quality of student learning.

2.3   The role of ICT in higher education

Information Communication Technology plays a number of roles in higher education. Hugo (2010) laments that technology is here to stay, thus students, teachers, parents, institutions, the government and stakeholders have to adapt and adopt the use of technology in their daily living. Higher education institutions around the globe, including Namibia, are increasingly under pressure to embrace new educational technologies alongside traditional means of delivering learning and teaching. These roles include producing graduates and 21st century citizens who are required to have knowledge-based economy (MBESC, 1999 and MOE,2005, 2007), as a catalyst to rethink our teaching practice (Flecknoe, 2002) and as a way to enhance and improve the quality of learning (Wagner, 2001,

Garrison & Anderson, 2003). Some of the roles that are played or potentially played by ICT in higher education include the following:

- Technologies like mobile cellular phones, Ipods and laptop computers offer opportunities for flexible and rich learning environments. The flexible and rich environment free[s] up the time, place, mode and pace of teaching and learning (Van der Westhuizen in Gravett & Geyser, 2004:157-159). Ehrmann (2002) argues that ICT is the way to improve the outcomes of higher education. His argument and that of Van der Westhuizen (in Gravett & Geyser, 2004) are vested in the notion that ICT is self-paced, interactive and resourceful, and has a distinctive agenda to make learning better, faster and cheaper for universities and colleges.

- ICT strengthens the contact among students and facilitates the level of communication between students and lecturers. D'Andrea and Gosling (2005) point out that, with increasing student numbers, teachers find it difficult to have personal contact with their students without the effective use of ICT.

- ICT increases opportunities for interaction leading to joint problem solving, collaboration and shared learning. For instance, the web 2.0 creates new opportunities for collaboration, dialogue and shared knowledge construction. Van der Westhuizen (in Gravett & Geyser, 2004) states that the blog, wikis, RSS (Really Simple Syndication) feeds, podcasting and video conferencing make the web an interactive medium in higher education. Indeed, features mentioned by Van der Westhuizen (in Gravett & Geyser, 2004) including ability to display multimedia elements such as text, graphics, animations, video and sound on one web page make the web a powerful tool for teaching and learning.

- ICT improves the capacity to "illustrate difficult concepts with animated or video sequences, simulations and scientific experiments" (Burbules & Callister, 2000:277). In support, Munro and McMullin (in Donnelly & McSweeney, 2009:153-154) emphasise that animations and simulations can help to clarify complex and abstract concepts and create learning opportunities that can "exist online and not in real classrooms situation". The above statement by Munro and McMullin (in Donnelly & McSweeney, 2009) can be backed up with real examples. For instance, a lecturer cannot have a deadly bomb blast experiment in the laboratory with students; its disastrous and life threatening but with simulation the real-life learning comes close to possible.

- ICT creates opportunities to enhance the quality of teaching and learning by providing and using learning materials and technologies which are appropriate to the subjects and needs of diverse students (Moran & Myringer in Donnelly & McSweeney, 2009). Universities and colleges are faced with diverse students. The diversity ranges between student background, culture, religion, language, full- or part-time students, working students, international students and students with disabilities. ICT seems to be the way by which most universities and colleges attempt to attend to the diverse needs of students.

- ICT is used to administer and manage higher education institutions across the globe. Laurillard (1994) stresses that ICT provides opportunities for departments, faculties, colleges and universities to communicate relatively easily and cheaply with students (on and off campus). Lewicki (2000:197) refers to ICT opportunities as an option for colleges and universities to improve the quality of communication with students and staff.

In addition to the roles outlined above, D'Andrea and Gosling (2005:134) point to features which modern educational technologies hold as a promise to achieve learning outcomes more effectively in higher education:

- Greater interactivity with learning materials (with or without a teacher).
- Asynchronous learning from multiple sites.
- Increased flexibility in location of learning.
- Greater opportunity to provide realistic and managed simulations.
- Greater opportunity to provide access and experience of large data sets.
- Increased access to a wide range of search tools and resources for learning.
- A student-centred approach.
- Greater student autonomy and independence.

Though educational technologies hold these promises, my experience with using ICT in teaching and learning is that, if not appropriately used, ICTs may not result in learning. In my view, teachers rather need to carefully design interactive learning activities and materials for students. They need to refrain from merely dumping materials on the web – trying to replace what they can rather hand out to students in class.

The promise of ICT in learning was tested by Czerniewicz and Ng'ambi (2004) in an empirical study. The study, which involved 1023 students, was carried out at the University of Cape Town to determine activities students engage in when they use ICT and the extent to which these activities support or relate to University of Cape Town courses. The findings of this study indicated that students using ICT in their learning engage in the following activities:

Accessing content – Students use the web to search for and find academic and course-related content and information in its broadest sense.

Reading content – Students use computers and other related ICTs to read text, take notes, look at images and listen to sound.

Communication – Students use ICT to share ideas and information, they engage in person-to-person communication of all forms, including one-to-one, one-to-many and many-to-many. In this case, students use social networks like facebook, email, chat rooms, free internet calls via skype; discussion groups and bulletin boards are mainly used for communication with other students, teachers and group members.

Application – Refers to guided tasks or practising tasks. Students use ICT like tutorial facilities to apply or implement what they have read. Further, students can demonstrate, explain or model the course content on the computer.

Synthesis – Students engage in bringing together a range of content and skills. Students word process their assignments and prepare presentations.

Support – Students download learning content and/or print documents so that the content and documents are available just-in-time when they need it (Czerniewicz and Ng'ambi, 2004:241).

These routine activities carried out by students at the University of Cape Town appear to be similar to activities carried out by other students in higher education elsewhere. In support of ICT that activities students engage in, Pedró (2005:349-400) acknowledges that ICTs "are everywhere" and therefore must be "present in university education". D'Andrea and Gosling (2005) also emphasise that the technological features as described above serve as a strong point of departure for higher education institutions to admit students with diverse learning needs and learning challenges.

Therefore, exploring the relationship between technological features and the approaches that students adopt when they engage in the learning process is important. In all probability, the use of ICT in learning has to be informed by learning theories and learning approaches, otherwise its application in teaching and learning might be of less value.

2.3   Learning approaches

The adoption of constructivist teaching and learning in higher education created opportunities for both teachers and students to redefine and design educational approaches. Howe (1999:2) describes learning as a variety of mental events which help people to extend their capacities and Vygotsky (1978) has defined learning as a movement from between or among individuals to within the individual. Shulman (1999:39) concurs with Vygotsky's view that learning is a "two-way or dual process". In order to learn something, a student's "inside beliefs and understandings must come outside and only then can something outside get in" (Gravett in Gravett & Geyser, 2004:28).

Gravett and Geyser (2004:26-27) distinguish two types of learning, namely:

Learning about, which refers to the learning of facts, concepts and procedures. This type of learning is characterised in education institutions and is part of university learning.

Learning to be, which describes learning the "practices of inquiry of the knowledge domain and how best to utilise the conceptual frameworks of the knowledge domain in support of the inquiry" (Gravett in Gravett & Geyser, 2004:27).

There are several concepts which are related to the concept of learning. These concepts are learning style, learning strategy and learning approach (Troskie-de

Bruin, 2007). Learning style is regarded as a relatively stable characteristic that forms part of a person's cognitive style or personality (Riding & Cheema, 1991). Biggs (1993) describes a learning strategy as a series of procedures that are followed to perform specific tasks. A learning approach is described by Prosser and Trigwell (1999) and Gravett (in Gravett & Geyser, 2004) as a relation between the learner and the learning task. This implies some form of interaction between the learner, the situation and the learning material.

Students adopt a learning approach when they engage in the learning process. Entwistle (1997) has identified three distinctive approaches to learning, namely the surface approach, deep approach and strategic approach. The students' choice of a learning approach depends on their perception of the demands of the learning task. Gravett (in Gravett & Geyser, 2004:24) asserts that each "learning approach leads to differences in the quality of learning outcomes". Therefore a student will adopt one of several approaches to achieve specific learning outcomes. These approaches will next be discussed briefly.

2.3.1 A surface approach to learning

The surface approach is characterised by the reproduction of knowledge. The intention of students who adopt this approach is to cope with the course requirements and the demands of assessment put forward by the teacher (Kember & Gow, 1994). Gravett (in Geyser & Gravett, 2004:24) stresses that the surface approach is further characterised by an intention to complete the requirements of an externally imposed task, i.e. "examinations or test" (Geyser in Gravett & Geyser, 2004:92). Marton and Saljö (in Marton, Hounsell & Entwistle, 1997) posit that students, in this instance, rely on rote learning in order to avoid failing, at the expense of quality, meaningful learning.

2.3.2   A deep approach to learning

In the deep approach to learning, the intention of the students is to reach understanding of the material. Biggs (1993) purports that those students who adopt a deep approach to learning are motivated by an interest in the subject matter and/or by its vocational relevance. In order to gain understanding, students become actively involved in the learning process and construct new knowledge by relating previous experiences and knowledge to new concepts and ideas. Geyser (in Gravett & Geyser, 2004:92) adds that, in a deep approach to learning, students must "make connections and actively search for meaning". This form of learning is associated with learning in higher education rather than the traditional method, which, as Brown (2000:11) indicates, relied heavily on "abstract conceptualisations of theories and formulas".

Entwistle (1997), Ramsden, Marton and Saljö (in Marton; Hounsell & Entwistle, 1997) and Gravett (in Gravett & Geyser, 2004) concur with Biggs (1993) that a deep approach to learning results in high quality, well structured and complex outcomes of learning. Students who adopt this approach look for patterns and underlying principles, examine logic and argument critically and cautiously (Troskie-de Bruin, 2007). I agree with Gravett (in Gravett & Geyser, 2004:23) that a deep approach is a "prerequisite for the realisation of significant learning that will last", the type of learning that is "associated with higher education".

2.3.3   A strategic approach to learning

Students who demonstrate a strategic approach to learning are motivated by the need to achieve success (Entwistle & Tait, 1990, Ramsden, 1997), in particular through obtaining higher grades. Because the intention of the student is to achieve maximum higher marks or grades, he/she perceives the task only as the medium to achieve this end and not as a learning opportunity. Students who use the strategic approach are too outcome-oriented (achieving high grades) rather

than learning-oriented (Biggs, 2003a) to understand the task and the process involved. Entwistle (1997:213-215) points out that the strategic approach to learning is characterised by a student putting consistent effort into studying, finding the right conditions and materials for effective study and managing time and effort efficiently. Students who adopt this approach work tirelessly to impress and/or fit into the perceived preference of the teacher in order to score high marks.

It is important to note that the learning context, including the learning environment, plays a role in the students' choices over learning approach. Furthermore, it is important to understand that a student's learning approach is "not a fixed characteristic" of the student (Gravett in Gravett & Geyser, 2004). A student who adopts a surface approach in one task should not be seen as a fixed surface approach student because he may change to adopt a deep or strategic approach in another learning task.

Gravett (in Gravett & Geyser, 2004) suggests a synthesis of student learning approaches. She distinguishes factors which encourage the surface approach from those that encourage the deep approach to learning. She emphasises that teachers in higher education influence students' approaches to learning. For instance, teachers who transfer large quantities of information to cover the syllabus or use recall questions encourage their students to adopt a surface approach to learning. Gravett (in Gravett & Geyser, 2004) asserts that lack of feedback (mostly formative) to students on learning tasks may lead to shallow understanding of the learning content, therefore result in students adopting a surface approach to learning. Troskie-de Bruin (2007) emphasises that teachers who create low expectations for their students drive them to adopt surface approaches to learning. Students may not work hard for success because they perceive the learning task to be easy.

Apparently, overloading students with learning content affect the learning process. Students with overloads rush through the content without critical analysis, reflection and in-depth understanding which is desirable in higher education. Unfortunately, teachers in some universities in developing countries use ICT to dump materials for students. These learning materials are often of poor quality, non-interactive and disorganised and affect learning to greater extent.

Teachers who encourage the deep learning approach focus on the main ideas which their students should learn. Therefore they align teaching and assessment (mostly formative) and support students to achieve the intended learning outcome (Gravett in Gravett & Geyser, 2004). Donnelly and McSweeney (2009:42) stress that ICT is not "panacea for education problems" and should rather be seen as a complement to teaching, learning, and assessment. The use of ICT learning should take into account the student's prior knowledge, active engagement and feedback (formative). This does not imply recognition and practice of constructivist perspectives only, but rather ensuring that students acquire life-long knowledge and skills. While promoting a deep approach to learning, it is important for teachers to explore and understand how ICT application in learning can be used in constructivist perspectives to achieve learning outcomes. Constructivist learning will be discussed briefly, next.

2.4   Constructivist learning

Since Namibia's independence in 1990, there has been radical political change as well as substantial shift of direction in the education system (Ministry of Basic Education, Sport and Culture (MBESC), 1993). The school curriculum, in particular, changed from previously observing positivist epistemology (behaviourist learning theory) to constructivist epistemology and learner-centred education (Dann, 2002; James, 2006). This shift also resulted in the teacher education curriculum adopting a constructivist epistemology paradigm shift in the

BETD (Basic Education Teachers Diploma) which is rooted in student-centred learning. According to Swarts (1999:30), the BETD programme not only encourages the application of student-centred pedagogy in all its forms, but it also "provides a constructivist perspective to learning and student teachers are expected to experience the type of learning processes that they will have to facilitate and create for their learners".

Attention to learning theories in the last two decades resulted in a shift from instructional approaches such as behaviourism, cognitivism and humanism to learner-centred approaches promoted by constructivism. This is because the latter theory promotes active learning through knowledge construction (Gagne, Briggs & Wager, 1992). The critical issue of including learning theories in ICT application design for teaching and learning has consistently been reported in literature (Pimentel, 1999; Randall, 2001; Egbert & Thomas, 2001; Koohang and Durante 2003). The literature has also consistently pointed out that constructivist learning theory is an appropriate match for ICT application design in teaching and learning in higher education (Hung, 2001; Hung & Nichan, 2001; Harman & Koohang, 2005). It might therefore be appropriate to explore the principles underlying the constructivist learning theory.

2.4.1 Principles of constructivist learning

Principles of constructivist learning such as active student engagement, construction of knowledge, collaboration and contextualisation of learning are important elements that should be considered in the use of ICT in learning. Teaching approaches in higher education have shifted from a so-called teaching paradigm to a learning paradigm (Barr & Tagg, 1995). Bitzer (in Gravett & Geyser, 2004) hints that, in the learning paradigm, higher education should no longer offer traditional teaching but produce learning. This implies a shift in teaching philosophies and practices towards adopting constructivist learning.

In order to enhance the quality of learning and teaching in higher education, the use of ICT needs to be understood. Van der Westhuizen (in Gravett & Geyser, 2004:170-172) adds that, to facilitate constructivism in an electronic learning environment, all learning activities must be active, constructive and collaborative. Learning activities in electronic learning environments must engage and encourage autonomy and initiative among students (Brown, 2000). These learning activities should allow students opportunities to work together, explore each other's skills, provide social support and contribute to online discussions. In this case, the WWW (World Wide Web) provides platforms for students to engage in discussions, provides support to communicate with other students and therefore supports co-operative learning.

From a constructivist learning perspective, learning is contextualized. Teachers in higher education have to design learning activities which require students to interpret, argue, practice and transfer ideas to other situations. Van der Westhuizen (in Gravett & Geyser, 2004) argues that it is in this way that students develop cognitively and construct, create and acquire knowledge. Barr and Tagg (1995) posit that, in the learning paradigm, higher education institutions and teachers should create powerful learning environments.

It seems obvious that these powerful learning environments should provide students with opportunities to reflect on what they are learning so that they understand it and are able to apply the constructed knowledge in a new context or another environment, such as at work. I therefore argue that the use of ICT in student learning should be aligned with constructivist learning principles. Aligning the two may improve the quality of teaching and student learning. Principles of good practice in teaching and learning will be discussed briefly, next.

2.4.2 Principles of good practice in undergraduate education

Universities are realising that there are efficiencies to be achieved, mostly in teaching, learning and administration, through the use of information communication technologies (McCann, Christmass, Nicholson & Stuparich, 1998). Although universities and teacher colleges are increasingly realising and acknowledging the value of ICT, spending money on technology seems to be problematic. In this respect, Dede (1998:36) postulates as follows:

> …information communication technology is a cost-effective investment only in the context of a systemic reform. Unless other simultaneous innovation in pedagogy, curriculum, assessment and school organization are coupled to the use of instructional technology, the time and effort expended on implementing these devices produces few improvements in educational outcomes and reinforces many educators' cynicism about fads based on magical machines.

This sentiment by Dede (1998) is equally shared by Knapper (2001:94) contending that:

> …technology may be a good solution for some instructional problems and in some cases it may be a partial solution. In other instances technology does little to address the fundamental teaching and learning issue or - even worse - provides a glitzy but inappropriate solution to a problem.

Higher education teachers in developing countries such as Namibia face difficulties in selecting appropriate learning technologies for students. Matching technological tools and resources with learning content and outcomes seems to be problematic. I therefore agree with Laurillard

(2001) who argues that, if ICT-based resources are not matched appropriately to both teaching and learning activities, intended learning outcomes will not be achieved.

The real promise of technology in learning is to use it in such a way that both teachers and learners are able to do things they could not do. Therefore using 'the seven principles of good practice in undergraduate education' developed by Chickering and Gamson (1987) is a useful exercise in defining learning benefits (De Vry & Brown in Brown, 2000). In addition, D'Andrea and Gosling (2005:137-140) provide an analysis of the relationship between 'the seven principles of good practice' and learning technologies. I have made an attempt to present this with examples in Table 2.2.

Table 2.2: Seven principles of good practice in undergraduate education and learning technologies

Principles of good practice	Learning technologies (solutions)
Good practice encourages student/faculty contact	Opportunities for teachers and students to interact through online discussion groups and chat rooms monitored by the teacher
Good practice encourages cooperation among students	Computer-based tools encourage spontaneous student collaboration
Good practice encourages active learning	Provide opportunities for students to simulate, engage in problem solving scenarios, time-delayed exchanges and real time seminar discussions outside the classroom.
Good practice gives prompt feedback	Provide immediate feedback in tutorials - hidden text option in word processors

	provides feedback that can be used by the student and then turned off so that only the revised text is visible
Good practice emphasises time on task	Technology increases students' effective time on task by reducing the time students spend on task components where they learn little or nothing at all
Good practice communicates high expectation	Significant real-life problems provided through web-based course materials challenge students to acquire information and sharpen skills of analysis, synthesis, application and evaluation.
Good practice respects diverse talents an ways of learning	Technology allows students with similar motives and talents to work in cohort study groups without the constraints of time and place.

Source: D'Andrea and Gosling (2005:137-140)

Table 2.2 above provides a glimpse of how ICT can address principles of good practice. It should be noted that in each instance of using these principles of good practice, teachers must be aware of basic teaching skills and students should be aware of basic learning skills. The seven principles match the constructivists' perspective, which is rooted in student-centred learning (Barr & Tagg, 1995). D'Andrea and Gosling (2005:139) stress that ICT matches many of the criteria for learner-centred teaching and learning, in which event the role of students change from passive recipients to learning initiators. The role of the teacher similarly changes to facilitator of student learning through contextualising and monitoring learning functions.

In my view, collaboration or co-operation among students in the learning process is an important element of constructivist learning theory. Therefore exploring collaborative and/or co-operative learning in ICT learning environments will make this study relevant. While using ICT in learning in higher education, teachers need to explore strategies and design learning activities which encourages students to work together and share experiences and knowledge. The literature reveals that social learning environments are conducive to learning, therefore collaborative and/or co-operative learning is explored next.

2.5   Collaborative / Co-operative learning and ICT

The use of ICT in learning cannot be isolated from collaborative and/or co-operative learning and these links need to be explicated. The explanation therefore should include the characteristics of collaborative and/or co-operative learning, and ICT capabilities in learning. Bitzer draws upon the work of several authors such as Johnson and Johnson (1991), Hertz-Lazarowitz and Miller (1992), Hergenhahn and Olson (1993) to define co-operative/collaborative learning as "the utilisation of (usually smaller) learner-groups in order to enable students to maximise their own learning and that of others" (Bitzer in Gravett & Geyser, 2004:43).

Co-operative learning entails learners working together in a small group on a learning task to achieve a learning outcome which has been described as a "highly beneficial form of learning" (McConnell, 2006:171). In Table 2.3 below, McConnell (2006) highlights the benefits of co-operative/collaborative learning in relation to the use of ICT.

Table 2.3: Benefits of collaborative and/or co-operative learning in relation to the use of ICT

Benefits of co-operative and/or collaborative learning	Use and benefits of ICT
Helps clarify ideas and concepts through discussion.	The WWW and internet host abundant information which helps students to understand ideas and concepts while working in discussion forums or discussion boards.
Develops critical thinking	ICT provides a forum for students to pose questions i.e. FAQ (Frequently Asked Questions), search facilities, simulation and gaming tools that enhance cognition. Students are not intimidated by the presence of the teacher, "even shy students have the opportunity to voice out" (Van der Westhuizen in Gravett & Geyser, 2004:170).
Provides information for students to share information and ideas.	Information on the internet and WWW can be shared via E-mail with other students in the same group. Students in similar groups can hold synchronous communication via chat rooms, video or sound conferencing.
Develops communication skills	Students can exchange ideas and communicate with other students in a similar group through text and

	aural/verbal communication i.e. chat rooms, sms, email, listservs, discussion forums, cell phone conferencing and free internet calling via skype.
Provides a context where students can take control of their own learning in a social context.	ICT provides opportunities for students to work alone in/at their own time, pace and place. Discussion groups on the web can serve this purpose; the role of the teacher is to monitor the discussion among group members and provide feedback.
Provides validation of individuals' ideas and ways of thinking through conversation, multiple perspectives and argument.	ICT provides students with opportunities to log on to an institution/faculty or subject web site and post comments on a topic of interest or that of a group. In turn, students are afforded the opportunity to read what other students from a similar group post on a topic. The WWW has features that present information to students in different formats i.e. text, graphics, animation, video and sound. In this way, students with learning challenges and those that are physically challenged are catered for.

(Source: Adapted from McConnell 2006).

According to Turoff (2000:1), collaborative learning is a process that emphasises active participation within groups of students and the teacher. Learners develop their knowledge while sharing ideas, reflecting and interacting in learning groups.

The role of the teacher is to facilitate the learning process by serving as a coach, mentor and guide for students to attain the envisaged learning outcomes. Bitzer (in Gravett & Geyser, 2004:51) points out four functions of the facilitator that are important for facilitating learning in co-operative small groups. These are (1) "structuring group activities, (2) fostering positive interdependence in groups, (3) intervening in co-operative groups and (4) managing feedback". To successfully apply co-operative learning strategies in higher education, teachers need to be aware of the above-mentioned functions of a facilitator.

McConnell (2006:26) points out that the shift to a "new generation of teaching and learning" which involves the web and internet for use in collaborative learning is slowly but steadily emerging and research should support it. Bitzer (in Gravett & Geyser, 2004) adds that co-operative learning provides new opportunities that improve the quality of student learning, therefore teachers in higher education should be increasingly encouraged to explore the possibilities of using ICT.

In my view, ICT should supplement conventional classroom teaching by providing learning materials and student activities online. ICT should not be misconceived as a replacement for teachers; it should rather assist teachers to deliver learning content and improve student access to learning materials. Experience as an ICT teacher, as well as the literature, has revealed that ICT alone cannot enhance the quality of teaching and learning. Although students use ICT for learning, they must be given opportunities for face-to-face contact with their teachers. The face-to-face contact builds a reciprocal relationship between the teacher and student, therefore creating an environment conducive to teaching and learning.

New educational models based on constructivism have reported shortcomings when compared to traditional higher education practices such as transfer of information and knowledge from the teacher (lecturer) to students. My

experience is that lectures, notes and textbooks used for teaching and learning are discouraged in higher education in favour of ICT. In some institutions of higher learning, the adoption of information communication technologies has been received with mixed feelings (Manathunga & Donnelly 2009). Some of the arguments against ICT are that learning is a social human activity and therefore technology cannot be a replacement for humans (teachers).

It is in this context that I review blended learning approaches as a possible aggregate between arguments for and/or against the use of ICT in higher education. A review of blended learning approaches will help interpret and understand perceptions of students in the study with regard to the use of ICT in learning in higher education.

2.6   Blended learning

Blended learning represents at least one application of constructivist perspective on learning in higher education. According to Taylor (2000:107), higher education contexts need to offer flexible learning environments which posit three features:

- Decreasing reliance on face-to-face teaching.
- Increasing reliance on student self management and independence.
- Increasing reliance on information communication technologies, particularly the use of the internet in teaching and learning (Taylor 2000:107).

The question emerges as to what constitutes blended learning?

Van der Westhuizen (in Gravett & Geyser, 2004:159) refers to blended learning as a "hybrid" where some constituents of the learning process are facilitated online and other constituents are facilitated in the classroom. This means that learning takes place both in the classroom and on the web. Saunders and

Werner in (Gravett & Geyser, 2004:159) define blended learning as learning that employs multiple strategies, methods and delivery systems by combining best features of online and classroom teaching. In higher education blended learning is considered as a mixed educational paradigm where traditional learning methods are supported by educational technologies to achieve intended learning outcomes. Therefore teachers need to explore these best features of ICT and conventional teaching in relation to constructivist learning theory.

I therefore refer to Table 2.2, which compares the seven principles of good practice in undergraduate education with educational technologies. Table 2.2 highlights ways in which ICT complement the constructivist perspective on the basis of seven principles. If ICT is used appropriately, as highlighted in Table 2.2, the quality of learning in higher education may improve. Course Management Systems such as WebCT, Lotus Learning Space, TopClass, Blackboard CourseInfo and KEWL may be used to effectively and efficiently complement learning in higher education. WebCT is one of the most common course management tools used in higher education. It is commonly used because of its features, such as email, discussion boards, bulletin boards, chat rooms, hyperlinks and search tools. If institutions of higher education adopt blended learning, access to information (24 hours) and learning materials is enhanced, therefore improving the quality of learning (McKenna, 2001, Czerniewicz & Ng'ambi 2004, Gipps, 2005).

Koohang, Riley, Smith & Schreurs (2009) introduced a model of constructivist learning theory in ICT learning environments. The model is based on a student-centred approach, where students are presented with a real life problem presented either by the students or the teacher. The students are then encouraged to develop their own objectives or goals in order to solve the problem. In this way students construct new knowledge by exploration, making connections with prior experiences and collaborating with other students. Students are empowered to be in control of their learning (Koohang 2009).

Student reflection on learning appears to be an important element in this model; they are asked by the teacher to reflect on their learning experience. In assessment tasks, students are required to give justification for their answers and it is at this moment that scaffolding becomes an important learning means because students are asked to go beyond what they have learnt. The role of the teacher is that of a facilitator, coach, mentor and/or guide to provide feedback to students.

Figure 2.1 illustrates the use of ICT in a constructivist teaching-learning environment as a whole educational approach. While using ICT in education, teachers need to consider their students' prior knowledge and learning needs and actively engage students in the learning process. Figure 2.1 emphasises ICT-integrated assessment, meaning that teaching, learning and assessment practices are aligned to achieve desired learning outcomes.
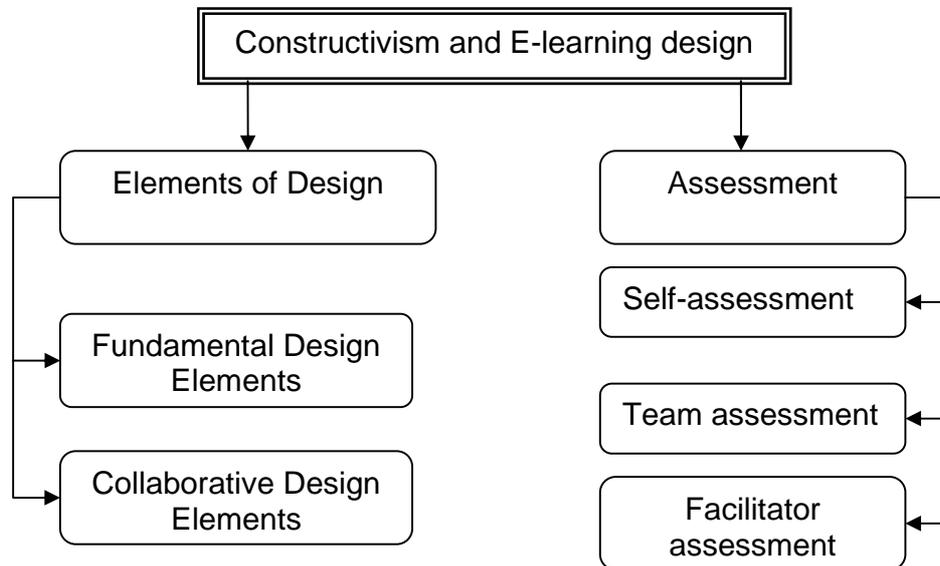
Figure 2.1: Constructivism Elements and E-learning Design of Learning Activities

Source: (Koohang, Riley, Smith & Schreurs: 2009)

Figure 2.1 highlights important elements which teachers using ICT in their teaching should consider. The fundamental and collaborative design elements are essential when teachers are designing learning activities or tasks for students. Murphy (1997) states that fundamental design includes elements such as high order thinking skills, exploration, prior knowledge, mediation, self-reflection and scaffolding. Meanwhile, collaboration, co-operation, multiple perspectives, multiple representation of content/concept or idea and self-negotiation among students form part of collaborative design. Koohang (2009) emphasises the integration of these elements when teachers plan learning activities and assessment tasks for students. From Figure 2.1 it becomes clear why using ICT in teaching and learning cannot be detached from strategies emphasising student-centred learning, collaborative and/or co-operative learning.

The paradigm shift in teaching and learning has an impact on assessment practices. Assessment in higher education is shifting from traditional practices, which were summative, to a more constructive assessment approach. This indicates how important assessment is, and its role in influencing student learning in higher education. Laurrilard (1994:223) comments that our use of ICT in teaching and learning should not be in "isolation but … re-integrated" in the whole context of learning and teaching.

For the purpose of this study, exploring the assessment of student learning broadened my understanding on how students perceive ICT-integrated assessment practices. Learning assessment appears to be an important element in the use of ICT in teaching and learning and is discussed next.

2.7   Student learning assessment

In Figure 2.1, Koohang *et al.* (2009) highlight important elements that teachers using ICT in their teaching should consider. They maintain that self, team and facilitator assessment must be integrated in the use of ICT in learning. Geyser (in

Gravett & Geyser, 2004:90) stresses the fact that assessment is an "integral part of teaching and learning" and therefore these three elements cannot be dealt with separately or be treated as add-ons (Beets in Bitzer, 2009; Boud & Falchikov, 2007).

Biggs (1993) shares a similar sentiment in explaining the principles of constructive alignment, which stresses a link between teaching, assessments and learning activities. Biggs (2003:141) stresses that teachers should "align assessment to what students should be learning". This sentiment implies that lecturers in higher education need to understand that there is positive backwash between assessment, teaching and learning and they have to explore the positive backwash more, to encourage deep learning. Barr and Tagg (1995) and Geyser (in Gravett & Geyser, 2004) posit that teachers in this way assist higher education institutions to produce students who are competent, knowledgeable, skilled and life-long learners.

2.7.1 Definition of assessment

The word 'assessment' derives from the Latin words 'ad' and 'sedere' (Branskamp 2005:75), which means 'to sit beside'. In higher education it implies that the student, other students, mentors, lecturers, curriculum designers, educational managers, government, employers, funding councils and parents (Brown & Knight, 1994) need to communicate on the legitimate or more authentic assessment practices resulting in students adopting deeper approaches to learning. I feel that this is a merely wishful thinking, because the reality in higher education institutions seems to be the exact opposite of mutual decision making regarding assessment. In most cases, assessment practices in higher education deliberately exclude parents, employers and funding councils.

Brown, Bull and Pendlebury (1997:8) provide a working definition of assessment according to which students and lecturers engage in a communication process

by stating that assessment is a "process to determine what students can do, making inferences and estimating the worth of their actions". This implies that lecturers in higher education should gather reliable and valid evidence of learning from students against the agreed learning outcomes and assessment criteria.

In his definition of assessment, Pahad (1997) point out that those teachers involved in assessment should find out what a student knows, what they understand and what they can do, otherwise assessment will not serve any purpose in educating the student. Palomba and Banta (1999:4) define assessment as the systematic collection, review and use of information about educational programmes undertaken for the purpose of improving learning and development. The distinction between the two definitions of assessment above concerns its use; the former mainly involves communicative and pedagogical use and the later involves managerial use. These definitions of assessment lead to two main forms of assessment practice in higher education, namely summative and formative assessment, which are discussed next.

2.7.2 Formative and summative assessment

Formative assessment determines what students know and avail opportunities through feedback, self-assessment and peer assessment for students to close the gaps of their learning deficiencies. Pahad (1997) laments that formative assessment is used to support the learner developmentally and give feedback to improve the teaching/learning process; a lecturer who uses formative assessment has a greater chance of understanding his/her students and improving own practice by using feedback to and from students (Luckett & Sutherland, 2000:102-104) and feed forward to inform the teaching/learning process.

On the other hand, Geyser in (Gravett & Geyser, 2004) describes summative assessment in the form of unseen exams, tests and assignments which takes

place at the end of a learning experience (i.e. unit, module, term or year) by awarding a grade to a student to determine whether the student is competent or not yet competent. Thus it is assessment of learning rather than assessment for learning. Concerning the fact that summative assessment comes at the end of a systematic and incremental series of learning activities, Morgan, Dunn, Parry and O'Reilly (2004:18-19) argue that it does not give learners opportunities to rework and improve their performance. Their argument is valid in the sense that students will only concentrate on the awarded grade (mark) and not the comments made by the teacher. The fact that the comments come long after the topic, unit or module has been covered and assessment carried out, results in students not bothering with it and regarding it as too vague and unhelpful (Kvale, 2007).

2.7.3 ICT assessment challenges and opportunities in higher education

Assessment in higher education is under-theorised (Beets in Bitzer, 2009:184-185). This results in formative assessment not being well understood by lecturers and this therefore makes its implementation in higher education weak. The transformation of higher education from elitist to mass education (Kvale, 2007:57-58) has resulted in a continuous increase in the number of students, which promotes large class sizes and heavy workloads. Lecturers therefore are not able to give the constructive feedback that helps students to learn and at the same time informs their teaching. Huba and Freedman (2000) also comment that increasing staff-student ratios may reduce attention given to individual students and result in very brief and infrequent feedback, which may be provided long after assessment has been carried out.

Assessment challenges mentioned in the previous paragraphs, such as misunderstanding of integrated assessment (Beets in Bitzer, 2009); constructive alignment of assessment (Biggs 2003); and positive backwash (Barr & Tagg 1995; Geyser in Gravett & Geyser 2004) allude to challenges of using ICT for assessment purpose in higher education. In higher education, the use of ICT in

learning and teaching is much further advanced, while development in use of ICT to support assessment is moving at a slow rate. In the United Kingdom, a number of universities have adopted online assessment systems that offer largely multiple-choice and short answer questions for tests and quizzes (Gipps: 2005). McKenna (2001) concurs with Gipps (2005) that the use of Computer Assisted Assessment (CAA) in higher education in the United Kingdom is growing. The growth in Computer Assisted Assessment focuses on staff development in writing questions and designing tests.

McFarlane and Weller in (Gipps, 2005:173) assert that Computer Assisted Assessment (CAA) refers to the use of computers to deliver, mark and analyze assignments or examinations. Gipps (2005:173) points to helpful ICT assessment hints which teachers in higher education might consider adopting, namely:

- Teachers can use multimedia or interactive materials online as basis for assessment tasks.
- Teachers can record student responses via computers and send feedback online.
- Teachers can conduct online peer assessment and collaborative or group assessment using chat-rooms and discussion boards.
- Teachers can evaluate student participation in online discussions from the transcripts.
- Lastly, teachers can use discussion boards to ask questions or address problems, send assignments and receive feedback via email.

In my view as an ICT teacher educator, the literature points to practical and helpful strategies and guidelines, which, if they are used appropriately, can result in good ICT assessment practices. However, Internet networks (connection speed and access) and ICT facilities may be obstacles. Barriers to the use of ICT in higher education are discussed briefly next.

2.8   Barriers to the use of ICT in education

Reportedly, ICT integration in pre-service teacher education programmes continues to be a challenge internationally. The main barriers were experienced and/or identified by students and teachers when incorporating ICTs in education. Ertmer (1999:51-52) has classified these barriers as falling into two primary categories: extrinsic and intrinsic. Extrinsic barriers include lack of resources, inadequate training, insufficient technical support and lack of time. Intrinsic barriers include teachers'/instructors' beliefs, visions concerning technology integration, and views about teaching, learning and knowledge.

With reference to the aforementioned barriers, a study that was carried out in pre-service teacher education institutions in Turkey by Goktas, Yildrim & Yildrim (2009:98) revealed that "overcrowded classrooms, lack of computer laboratories and presentation equipment" are barriers to ICT implementation in learning.

I concur with Goktas, Yildrim and Yildrim (2009) that these barriers, including technical student support and finance, hinder successful use of ICT in education. In developing countries, including Namibia, access to higher education is highly encouraged by government policies, to the extent that higher education is unable to accommodate massive numbers of students and their ICT needs today. The ever changing educational technologies continue to pressure higher education financially with regard to keeping up-to-date with the latest developments in ICT. Continuity of these ICT barriers and some not mentioned in this study may negatively affect the quality of student learning, teaching and new forms of assessment.

2.9   Summary

This literature review has highlighted a number of issues that should be borne in mind when investigating the use of ICTs in learning in a higher education context.

Firstly, Namibia's ICT policy for education points out critical issues for attention to produce 21st century citizens who are capable of living in a knowledge-based economy (KBE). Issues such as availability of funds; access to facilities; ICT training; co-operation among stakeholders; and applicability of ICT to education are important elements that need attention. The ICT policy for education set higher education, especially teacher training in the forefront for the use of ICT in teaching and learning. Although ICT policy acknowledges educational technologies as tools to improve the quality of teaching and learning, caution is expressed that it is through willingness, attitude and value we (teachers and students) attach to it to reap its benefits in education and life in general. In the Namibian context, ICT policy for education serves as a policy framework to guide and uphold the use of ICT in the education sector.

Secondly, the role attached to the use of ICT in learning seems to be significant. Literature points to the fact that educational technology may create flexible and rich learning environments in higher education. In learning environments where ICT is used, there is greater on- and offline access to learning materials and learning content. The role of ICT in this context is to create opportunities for students to access the learning materials; communicate with other students to share ideas; and collaborate on learning tasks using ICT. In higher education contexts, ICT is not only used for learning and teaching; it is playing an administrative role to communicate easily with on and off campus students. In addition to the roles above, ICT seems to be the solution universities and colleges are adopting to attend to diverse needs of students. Literature re-affirms that, although ICT plays a significant role in education, teachers need to design learning materials carefully so that the materials interactive, rather than merely dumping handouts online. Dumping learning materials online does not fit in with the learning paradigm as propagated in higher education.

Thirdly, aligning educational technologies with constructivist learning principles is regarded in the literature as important in improving learning and teaching in higher education. While using ICT, students need be actively engaged in learning; constructing new knowledge and referring to prior knowledge in order to build new cognitive structures. Principles of scaffolding along with educational technologies need to be integrated to result in meaningful learning. Literature points out that information communication technology (ICT) is not a panacea for educational problems, but by combining educational technology with applicable learning models such as constructivism, the overall quality of learning in higher education may improve.

Fourthly, teachers in higher education are encouraged to continue to discover and develop ways to implement new educational technologies into their teaching-learning environments and focus efforts on facilitating learning. One of the strategies which teachers in higher education may explore is co-operative learning, because it provides opportunities to enhance the quality of learning. The literature suggests that, while using ICT in teaching and learning, students should also be afforded opportunities to work together in small groups to complete learning activities, share ideas, engage in discussions and receive support from the teachers. Therefore teachers in higher education seem to remain prominent in their role as facilitators of the learning process.

Fifthly, assessment seems to be strongly linked to teaching and learning and therefore the literature stresses integration of assessment along with the use of ICT in learning. Strategies by which students can be assessed using ICT are pointed out and, although there are recognisable limitations in using ICT in assessment, integrated ICT assessment methods seem to be popular and improving in higher education. The literature claims that the use of ICT-integrated assessment may mean that teachers' workload may be reduced. Although the use of ICT in education is overwhelming, it is received with mixed feelings in some institutions of higher education. This is because ICT application in teaching

and learning comes along with challenges that may result in its unsuccessful implementation in education. The literature also points out that barriers such as finance, student beliefs and attitude towards ICT, facilities and access, to mention but a few, may hinder effective learning with ICT.

Lastly, the success of implementing ICT in higher education institutions seems to depend on institutional ICT strategies; the value and willingness of teachers to apply ICT in their teaching; and perceptions of students. Access to ICT facilities; availability of funds to finance new educational technologies; and student needs may exert pressure on higher education. Although these pressures are real, ICT is here to stay as it has firmly positioned itself in education. It will therefore continue to influence activities in higher education.

The chapter that follows will discuss the research methodology employed in the empirical part of this study.

CHAPTER 3

RESEARCH METHODOLOGY

Introduction

As briefly described in Chapter 1, the research strategy for this study was a quantitative survey. A non-experimental design using a limited survey was found suitable for investigating the perceptions of third-year student teachers regarding ICT application in learning at the Caprivi College of Education in Namibia. In the current chapter, the quantitative survey design, the sampling techniques, data collection methods, data collection procedures and ethical issues are discussed. A brief discussion outlining data analysis procedures is also included.

3.1   The quantitative survey as research design

Slavin (2007:7) refers to quantitative research as research whereby numeric data is collected and statistically analysed. In addition to Slavin's definition, Aliaga and Gunderson (in Muijs, 2004:1) describe quantitative research as explaining phenomena by collecting numerical data that are analysed by means of mathematically-based methods, in particular statistics. Maree and Pietersen (2007) assert that quantitative research is presented as objective and systematic in the way it uses the numerical data from a selected sample of a population to generalise findings to the population that was studied. Simply, quantitative research is empirical research where the data is presented and analysed in the form of numbers (Punch, 2009). The numbers in quantitative research need to be interpreted by the researcher against a conceptual or theoretical framework in order to make meaning. Preference for quantitative research among researchers may be based on the fact that it (1) conceptualises reality in terms of variables, (2) measures variables and (3) studies relationships between variables (Punch,

2009). These factors seem to influence researchers to use quantitative methods despite mathematical equations and interpretations of the findings that may be a challenge for novice researchers.

Once a researcher has decided on quantitative research studies, (s)he has to choose between the three main types of quantitative research designs, such as true-experimental designs, quasi-experimental designs and non-experimental designs. Muijs (2004) states that experimental design represents a position whereby a researcher conducts a test under controlled conditions in order to demonstrate a known truth or examine the validity of a hypothesis. By exerting control over variables and environment, the researcher manipulates the outcomes of the study or experiment.

In experimental research designs, researchers make comparison between two or more groups, one being an experimental group while the other is a control group therefore making it the best method to "examine causality relationship between variables" (Muijs, 2004:32). In a quasi-experimental design, the researcher does not control experimental treatment but has control over when to measure the outcome variables in relation to exposure to the independent variable. However, in non-experimental designs, researchers do not conduct any experiment, neither exert control over variables, but rather uses the real situation and variables as they appear in practice.

To illustrate the differences between three types of quantitative designs, Punch (2009:220) suggests a continuum of these research designs (see Figure 3.1). On the left hand end of the continuum, the true-experimental designs are depicted, the non-experimental designs are on the right and the quasi-experimental in between. The foregoing discussion concerning control over variables, groups and comparing relationships is reflected in the continuum. The continuum may serve as an explanation of quantitative research designs which I found helpful in this study.

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Experiment	Quasi-experiment	Non-experiment
Manipulation of Independent variable(s)	Naturally occurring treatment groups	Naturally occurring variation in independent Variables
Random assignment to treatment groups	Statistical control of covariate(s)	Statistical control of covariate(s)

Figure 3.1: Continuum of research design
(Source: Adapted from Punch, 2009:220)

It was not possible to conduct a true experiment on students' perceptions of the use of ICT in learning in my study as interventions need to be most carefully constructed to avoid putting any participant at an advantage. It was therefore decided that a non-experimental approach using a quantitative survey was the best option for studying the phenomenon at hand. Non-experimental designs are more realistic in exploring phenomena in a more naturalistic manner and for this study exploring perceptions of student teachers on the use of ICT in their own context at a higher education college seemed to be the a suitable design for the research.

The fact that the researcher cannot manipulate the variables (independent) while studying a phenomenon makes this type of design valid and appropriate to use, specifically when studying the attitudes, perceptions and beliefs of people (Slavin, 2007). This sentiment is shared by McMillan and Schumacher (2001:34) who argue that survey research is suitable in educational settings when the researcher investigates attitudes, opinions and beliefs. In this context, the study topic (investigating third-year students' perceptions of the effect of the use of ICT on learning) corresponds well with the chosen survey research design.

A survey is well suited to descriptive studies (Muijs, 2004 and Maree, 2010) and it allows the researcher to look at relationships between variables which occur in real-life contexts. For this study, survey data allowed me draw relationships between students' perceptions and other identified variables such as access to ICT, ICT skills, subject integration, age and gender. These variables may or may not influence the perceptions of students concerning the use of ICT in learning.

McMillan and Schumacher (2001:602) define survey research as "assessment of the current status, opinions, beliefs and attitudes by questionnaires or interviews to a known population". In the same vein, Slavin (2007) asserts that the purpose of a survey is to record the opinions or characteristics of a population of interest. Therefore, in this study, I found a survey relevant in describing students' perceptions towards ICT application in learning. I highlight some of the advantages and limitations of using a survey research design in quantitative studies in the paragraph that follows.

The first advantage of using survey research is that it is flexible, therefore allowing a researcher to study a wide range of research questions involving aspects such as describing a situation or studying relationships between variables (Muijs, 2004). Furthermore, the researcher studies real-life situations and therefore it is easier to make generalisations about the study population where applicable. The other advantage of survey research is that the researcher can collect large quantities of data at low cost in comparison to other methods. It is also very easy to guarantee the research participants' anonymity, especially when anonymous questionnaires are used as research instruments. Assuring anonymity and confidentiality is easy as participants normally do not indicate their identity on questionnaires. Lastly, surveys allow researchers to obtain or discover opinions and feelings about a particular situation (Muijs, 2004).

However, survey research has its own limitations in that it is not suitable for answering questions of cause and effect, when compared to experimental designs (Muijs, 2004). In order to answer questions of causality in survey design, the researcher needs to set up experiments and sometimes follow a longitudinal design, as well as employ statistical models, which may be complicated. These studies take much time to complete, may be costly and are not very suitable for educational situations, as aimed at in my study. For this survey, a cross-sectional singular survey was decided upon, to be executed by collecting data from third-year student teachers on one occasion in one location. The decision for a cross-sectional study was influenced by factors such as cost, distance and scheduled time for completion. It may be argued that a longitudinal design (repeating the survey with groups of students at different chronological stages) might have been a better option. However, students were going off campus for school-based studies for thirteen weeks. Third-year students left for school-based studies a day after the questionnaires were distributed. Therefore following them for a second round at various schools would have been a costly exercise and time consuming.

A survey provides opportunities to use a variety of methods to obtain information from a set of respondents or participants involved in a study. A survey may be conducted by distance or face-to-face (questionnaire), in-person interviews, e-mail or telephone interviews.

As the study was of a quantitative nature using numerical data and employing statistical procedures, it was mainly positioned within a postpositivist world-view (Creswell, 2009). Postpositivists believe in the world of objective reality and try to present the world reality as best as possible. Researchers who work within post-positivist paradigms believes in the existence of realities which cannot be perfectly understood (Maree, 2007). Nieuwenhuis in (Maree, 2010:65) points out that postpositivist researchers focus on establishing and searching for evidence that is valid and reliable in terms of the existence of phenomena, rather than generalising findings to a population.

Postpositivist researchers can use either or both quantitative and qualitative methods in pursuit of truth and evidence. This study may fit within a postpositivist paradigm as it firstly adopted the quantitative method and, secondly, the phenomenon which was investigated represents a contextualized slice of reality of students involved in the study. Lastly, the findings of the survey were not generalised to other student populations outside of the Caprivi College of Education.

3.1.1 Research aim and questions

As stated in chapter one, the aim of this study was to investigate third-year student perceptions of the possible effect of ICT application on student learning in one teacher education college in Namibia., This aim led to several emerging questions, but, in the final analysis, the study was guided by the following main research question:

What are third-year students' perceptions of the effect of the use of ICT on their learning?

The answer to this central question was sought in this study through answering the following subsidiary questions:

- What perceived ICT skills do third-year student teachers at Caprivi College of Education possess?

- What perceived purpose(s) are ICT skills used for as viewed by third-year student teachers at the Caprivi College of Education?

- What perceived learning strategies do third-year student teachers at the Caprivi College of Education adopt while using ICT?

- Do gender and age play a role in third-year students' perceptions of using ICT in learning?

3.2   Sampling

The population for this study included one hundred and thirty male and female third-year student teachers at the Caprivi College of Education in Namibia. These student teachers were in their final year (academic year 2010), pursuing an undergraduate diploma qualification in Education. A research population is the total target group who would in an ideal world be the subjects of the study and about whom a researcher is trying to say something (Punch, 2009). Furthermore, Muijs (2004) defines 'population' in research as a group to which research findings are generalised. The population (as well as sample) for this study included all of the one hundred and thirty male and female third-year student teachers between the ages of eighteen and forty years at the Caprivi College of Education.

Sampling in quantitative research is regarded as the actual group of people included in the study and from whom the data are collected. In order to collect data in this case, "census" sampling was used. Census sampling is described as including all members of the population in the study as a sample (Muijs, 2004). This method could also be related to systems used by governments to count all citizens of a specific country. Census sampling of all male and female third-year student teachers between the ages of eighteen and forty years at the Caprivi College of Education was therefore used in this study.

My choice for third-year student teachers as sample for this study was influenced by their exposure (three years in college) and experience of using ICT in the college. Secondly, these students were considered more mature and able to reveal their attitudes and beliefs about using ICT in teaching and learning with

lesser regard for authority. This method of sampling was convenient in this study as it allowed me to collect more data from a large number of student teachers and at the same time avoid sampling bias. For purely descriptive statistics, however, the sample size is not that crucial (Opie, 2004) and a larger and more representative sample of the population increases data validity (which will be discussed below). This also means that any findings from this study are only applicable to third-year student teachers for academic year 2010 at the Caprivi College of Education in Namibia and cannot be generalised to other groups of students and/ or other institutions in higher education in Namibia or elsewhere.

3.3   Data collection instrument

Good research requires that data are collected from a sample using an instrument that is valid and reliable. Before choosing an instrument to collect data, the researcher should be certain about what kind of data is needed, in order to answer the research question(s). A closed-ended questionnaire (see Annexure A) was used in this study to collect data from third-year student teachers at the Caprivi College of Education. Slavin (2007:108) describes a closed-ended questionnaire as an instrument for which a limited number of possible responses are specified in advance.

Therefore, in a closed-ended questionnaire, participants are asked to choose between answers provided by the researcher, either by ticking or crossing the answer of their choice. This makes closed-ended questionnaires easy and quick to answer by respondents. They save time to work with because answers are pre-coded and quantified according to the level of agreements on a rating scale in the questionnaire. Slavin (2007:109) argues that open-ended questionnaires are difficult to code and are disliked by respondents because they take too much time to complete. As a result, such questionnaires may be returned with incomplete or insignificant answers.

Answers (in numbers or symbols) to questions on closed-ended questionnaires can easily be entered on a spreadsheet for statistical analysis. This saves much time for the researcher. In closed-ended questionnaires the researcher can easily standardise and compare answers across participants or respondents – much more so than in open-ended questionnaires (Muijs, 2004). Closed-ended questionnaires are easy to complete, participants do not lose much of their time and as a result the number of completed questionnaires returned with incomplete answers is reduced.

Although closed-ended questionnaires are preferred by respondents compared to open-ended questionnaires, they also have limitations. One of the limitations is that the respondents have no opportunity to add their opinions about a particular issue raised by a question or item. Therefore, closed-ended questionnaires to some extent do not necessarily reflect the ultimate views of the respondents. They merely reflect the choice of the researcher (in structuring the instrument questions) and the respondent (in answering the questions). Reliability and validity of the instrumentation is discussed next.

3.3.1 Reliability

Carrying out research using an instrument requires that the instrument used to collect data is reliable and valid. Maree (2007) explains that reliability may be assured by the researcher by using similar instruments at different times or administering the instrument to different subjects of the same population and yet gets similar results. De Vos, Strydom, Fouché and Delport (2002:168) state that reliability refers to the extent to which independent administration of the same instrument consistently yields the same results under comparable conditions. From the above explanations of reliability I have learnt that reliability in research involves one central concept, and that is consistency. Consistency in this context means that the instrument used to collect data should produce similar results

(findings) when used to similar subjects even at different times. Below is a brief discussion on the types of reliability (Maree, 2007 and Punch, 2009).

Test-retest reliability is assured when the researcher administers the research instrument to the same participants on two or more occasions and afterwards makes comparisons to determine whether the instrument is reliable or not.

Equivalent form reliability occurs when a researcher administers two equivalent instruments at different times, measuring a similar construct with the same participants or subjects.

Split-half reliability is assured when the researcher divides the items that make up the instrument into two and form two separate instruments.

Internal reliability relates to the use of multiple but similar items of the instrument which are consistent and work in the same direction to measure a certain construct.

Taking cognisance of these types of reliability, the questionnaire for this study was administered as a once-off cross-sectional study influenced by factors such as cost, distance and time. Given the limited scope of this survey, costs and time constraints, issues of reliability as outlined above were not practical to apply in this study. However, I point out that these were options I would have considered to enhance reliability of the research instrument. However, this was not done due to cost and time constraints, as mentioned earlier.

A Likert-type scale was used to render responses on the items in the questionnaire. Maree (2007) describes a Likert scale as convenient when a researcher wants to measure a construct. For this study, the construct was perceptions of ICT application. The measurement was achieved by asking a

series of Likert-scale type questions which are outlined in the paragraph that follows.

The closed-ended questionnaire consisted of twelve questions which were grouped according to demographics, ICT skills and ICT beliefs, and attitudes towards teaching and learning. Two items (according to groups) in the questionnaire required participants to answer 'Y' for yes or 'N' for no, whereas three questions (according to groups of related items) required participants to rate themselves on the five-point Likert scale with reference to their level of agreement or disagreement regarding the purpose and use of ICT in learning.

The Likert scale as used in this investigation included categories such as 'Very often', 'Often', 'Sometimes', 'Rarely' and 'Not at all'. While other questions on the closed-ended questionnaire included items where participants were asked to rate their ICT skills using categories such as 'Excellent', 'Good', 'Poor' and 'Not applicable'. Lastly, participants were asked to rank themselves on a scale with categories of one to four, four being 'Definitely agree', three for 'Agree', two for 'Disagree' and one for 'Definitely disagree' regarding third-year student teachers' beliefs and attitudes towards ICT application in teaching and learning.

Another aspect that I would have considered to ensure reliability of the instrument is to pilot test the questionnaire. Pilot testing is a "trial run of the study done for the sole purpose of testing the instrument and identifying any issues that need to be addressed before the actual study is conducted" (Slavin, 2007:107). However, pilot testing of the questionnaire was not done in this study due to the fact that third-year student teachers were going out to schools for thirteen weeks for their school-based studies. Therefore following them to various schools would have been very costly and time-consuming. A question may be asked by the reader as to why the instrument was not piloted on other student teachers (not necessarily third-years). First-years were the only student teachers on campus at the time. In my opinion, first-year student teachers were not as exposed to

learning with ICT when as second- and third-year student teachers. Therefore, piloting the instrument on first-year student teachers may have generated data that was unreliable in terms of students' perceptions of ICT application in learning.

3.3.2 Validity

De Vos *et al.* (2002) and Maree (2007) propose that an instrument can only be regarded as valid when it measures what it is suppose to measure or does what it is supposed to do. De Vos *et al.* (2002) and Maree (2007) classify validity as follows:

Face validity refers to the extent to which the instrument used to collect data appears to be valid after it has been scrutinised by experts in the field where research is conducted. Comments, assistance and advice from experts are helpful to the researcher to make adjustments on the instrument so that it is valid.

Content validity refers to the extent to which the instrument used to collect data covers the complete content of the particular construct that is set out to be measured (Maree, 2007:217). The researcher in this case made available a draft version of the instrument to experts (Professor Eli Bitzer my study leader and head of the Centre for Higher and Adult Education at Stellenbosh University) in the field for comments before it was finalised and used to collect data. Assurance of getting a valid instrument after scrutiny from experts in the field is very highly regarded and novice researchers should take advantage of this form of validity.

Construct validity involves determining a degree to which an instrument successfully measures a theoretical construct. In this case the instrument used to collect data was "standardised and the construct covered by the instrument [was] measured by different groups of related items" (Maree, 2007:217). If the items in

the questionnaire do not measure the main construct, the instrument becomes invalid.

Criterion validity refers to developing a measure usually expected, in theory, to be related to other measures or to predict certain outcomes. Criterion validity of the instrument that is used to collect data is determined by the correlation between the instrument and criterion. If the correlation is low it means that the validity of the instrument is low, whereas when the correlation is high, so is the validity of the instrument.

For this study, validity was enhanced by availing the instrument to two different expert opinions: Professor G.D. Nel from the Centre for Statistical Consultation at Stellenbosch University and Professor Eli Bitzer, my study leader and head of the Centre for Higher and Adult Education at Stellenbosh University. Their comments and advice helped me to shape the items in the questionnaire to collect data that increased its relevance, reliability and validity to answer the research questions for this study. Through this assistance, content validity for the questionnaire was enhanced.

The involvement of third-year student teachers who were more mature and exposed to ICT also added value to the reliability and validity to the data collected by using the questionnaire. Although I have been teaching these students for the past two years, they were, in my opinion, sufficiently mature to give their answers independently and with some authority.

It should be noted that the survey part of this study encountered several challenges. These challenges will be discussed as limitations to the study in the last chapter of this report.

3.4 Data collection procedures

In order to collect data for this study, a closed-ended questionnaire was distributed to the census sample. I distributed the questionnaire to a group of one hundred and twenty third-year student teachers in the main assembly on campus at the Caprivi College hall after a collective meeting. Ten of the third-year student teachers were not present at the time when the questionnaire was distributed, thereby slightly reducing the size of the census sample for this study.

Prior to the distribution of the closed-ended questionnaire, permission to conduct the study was granted by the Ministry of Education of Namibia (see Annexure D) as well as the Rector of the Caprivi College of Education (see Annexure C). Furthermore, ethical clearance (reference number: 328/2010) to carry out the study was granted by the Research Ethics Committee of Stellenbosch University (see Annexure B). The purpose of the study and questionnaire was explained to one hundred and twenty third-year student teachers present at the time. Reference was made to the covering letter and ethical consent form which were attached to the questionnaire.

Participants were allowed enough time to complete the questionnaire in their own time. To make it easy for students to return the questionnaires anonymously three boxes were placed in three strategic positions on campus, namely the entrances to the college library, computer laboratory and student tuck-shop. Students had earlier been informed of the purpose of the boxes and the positions for these boxes in the college. It should be mentioned that this strategy helped me to receive back completed questionnaires from students as they were off-campus for thirteen weeks for their school-based studies in different schools surrounding the town of Katima Mulilo in Namibia.

3.5 Ethical considerations

The involvement of human subjects in research requires that ethical issues are observed. Slavin (2007) asserts that observing ethics is necessary for the researcher to avoid public concern over real and potential abuses of participants and data by the researcher. In this study, ethical considerations guided me to be honest throughout the research process and have trust in students. Moral principles such as wronging others, respect, preventing harm and being fair are important for every researcher to understand, apply and adhere to during and after the research process. My understanding is that ethical considerations in research do protect both the researcher and the subjects involved in the study. Therefore it is necessary for the researcher to observe the code of ethics and maintain professional conduct during the research process.

In this study, students were informed about their voluntary participation in the research and that they had the right to withdraw from the study at any time without any penalty. Student teachers were informed that they were not compelled to answer all the questions and could opt for not answering any question(s) in the questionnaire without any penalty. Participating student teachers were asked not to identify or write their names, initials, student numbers or any form and/or apply any sign leading to personal identity of the student on the questionnaire.

Students were informed that findings from this study would be presented anonymously without any form of personal identity of the participants in the study. The issue of informed consent was assured by two parties (student teacher and researcher) signing a detailed consent form (see annexure E). I stressed that students had to read and understand the contents of the consent form and ask any question(s) that arose before they signed the consent form. Furthermore, contact details of individuals who may have been contacted for any

question, concerns or queries about the study were provided to student teachers who participated in the study.

3.6   Data analysis procedures

In quantitative research, data can be analysed using computer software packages. These computer software packages analyse numeric data which are pre-coded by the researcher so that it becomes easier for analysis. For this study, raw data which were collected from third-year student teachers were entered on a spreadsheet. The data were analysed using Statistica, a computer aided software program used to help analyse quantitative data. For this study, an expert statistician from the Centre for Statistical Consultation at Stellenbosch University was consulted and this expert helped with data analysis. Descriptive statistical analysis using frequencies presented in tables and graphs were adopted for this study.

Data was prepared on an excel data sheet which included nominal and ordinal variables in which I was interested. Data was analysed using version 8 Statistica computer software. Firstly, nominal and ordinal variables were presented graphically in form of histograms and then frequency tables. The histograms and frequency tables showed similar data. Histograms were favoured in this case because it is easy to identify outliers when compared to frequency tables.

A contingency table (better known as cross tabulation) was used to compare the relationships between nominal variables such age, computer skills and learning with ICT. Cross tabulation refers to a "table that shows the number of cases falling into each combination of the categories of two or more variables" (Muijs, 2004:114). In this survey, the Chi-square test was used to measure the influence between variables. Chi-squared refers to a statistic used to compare frequencies of two or more groups. Maree (2007:246-248) asserts that Chi-squared belongs to the category of non-parametric testing and therefore is suitable in a study

where the relationship or association between two nominal variables is investigated. In this study, Chi-squared was used to examine the relationship between students' perceptions regarding ICT subject integration and traditional learning methods. Spearman's rank correlation coefficient was used in this study to determine relationships between variables such as gender and learning with information communication technologies. Analysed data using Spearman's rank correlation coefficient were presented on graphical scatter plots.

3.7   Summary

In this chapter, quantitative research adopting a non-experimental study as research design was discussed. The research design for this study was survey research, as literature points out that survey research is suitable and realistic when a researcher explores phenomena in more natural environments. Therefore opting for non-experimental research using a survey design to investigate the perceptions of third-year student teachers regarding the the use of ICT in learning was seen as relevant. Choice over a research design is influenced by, amongst other factors, the main research question that needs to be answered. While developing or constructing an instrument for data collection, it is important that issues of the reliability and validity of the instrument are accommodated, otherwise the collected data may be unreliable and invalid, therefore affecting the findings of a study.

Census sampling of the total third-year student teacher population at the Caprivi College of Education was involved in the survey. A closed-ended questionnaire was developed and implemented and its results were calculated and analysed according to acceptable descriptive statistical measures. Students completed the questionnaires in their own time.

For this study ethical issues such as informed consent, voluntary participation, right to withdraw from the study, anonymity and right to refrain from answering

any of the question(s) were accounted for, while permission to carry out research was obtained from relevant authorities and institutions.

The chapter that follows will present raw data, provide an analysis of the data and reveal the findings from the survey.

CHAPTER 4

FINDINGS

Introduction

The main purpose of the limited survey was to investigate third-year student perceptions of the possible effect of the use of ICT on student learning in one teacher education college in Namibia. This was done to determine the students' perceived ICT skills, abilities, attitudes and beliefs and, as pointed out in Chapter 3, data were collected by administering a closed-ended self-generated questionnaire. This chapter presents the findings from the survey and provides an analysis thereof.

(Note that there are some items on the questionnaire such as ethnicity and previous computer experience which were not included in the findings of this study. The exclusion of some of these variables was merely optional and does not imply that they are irrelevant).

4.1   Profile of the students (Gender and Age)

Closed-ended questionnaires were distributed to one hundred and twenty third-year student teachers at the Caprivi College of Education. A total of seventy-six (63%) out of the one hundred and twenty distributed questionnaires were received back, indicating an acceptable response rate. Broken down by gender, there were 38 (50%) male and 38 (50%) female respondents, indicating that there was equal gender representation of male and female students as represented.

As age was also considered a criterion variable in this study (to be discussed later in this chapter), the following histogram shows the percentage distribution of third-year student teachers according to age.
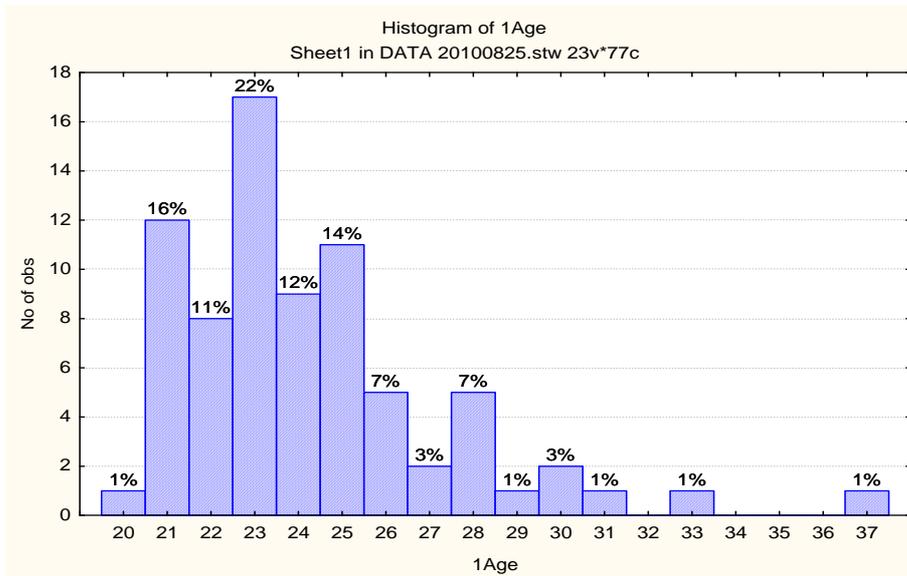
Figure 4.1:   Percentage distribution of third-year student teachers according to age

A high proportion (76%) of third-year student teachers was between the ages of twenty and twenty-five years, whereas fewer (21%) were aged between twenty-six and thirty. The least distribution (6%) of students according to age was observed between the ages of thirty and thirty seven years.

(The reader should note that research questions for this study guided the presentation of data).

4.2   What perceived ICT skills do third-year student teachers at Caprivi College of Education possess?

4.2.1 Word processing, spreadsheet, email, internet and presentation

Controlling for student perceptions on using ICT skills or computer applications was problematic as students were not directly observed using different ICT applications. However, question 9 on the questionnaire required that third-year students rank their perceived ICT competences such as word processing, spreadsheet, email, internet and presentation on the following scale: 4 - excellent, 3 - good, 2 - poor and 1 - no capability. Findings are presented in Figure 4.2.
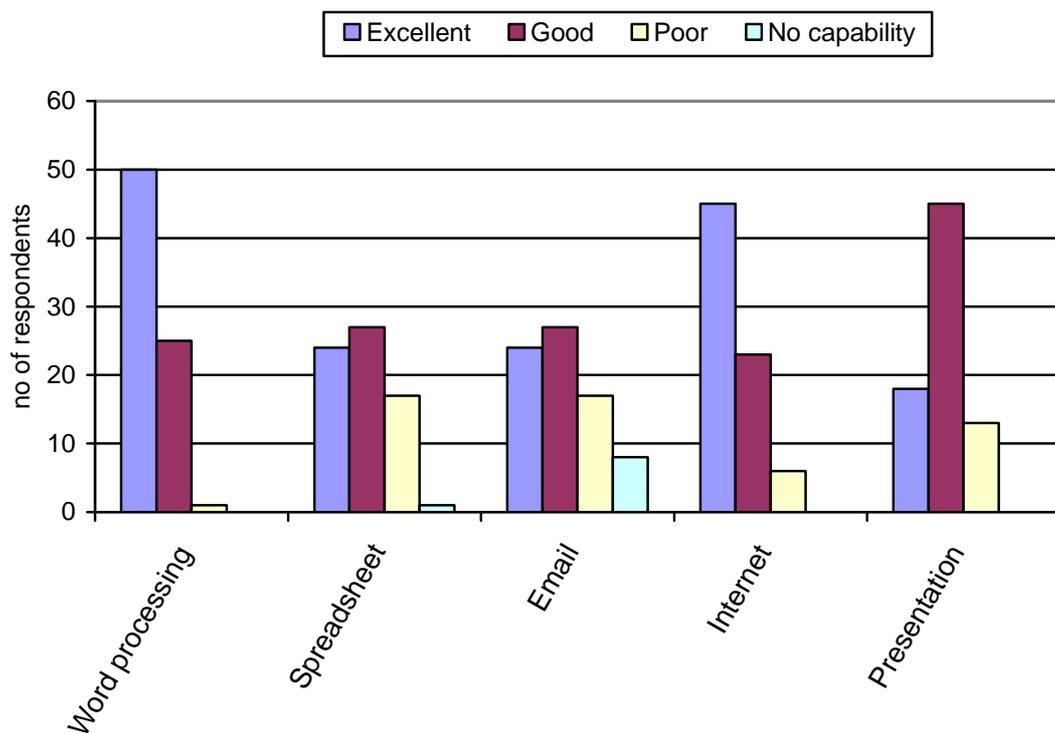
Figure 4.2:   Third-year students' perceived ICT skills

Overall, Figure 4.2 shows that third-year student teachers perceived themselves to possess good skills in all computer applications. Excellent ICT skills were perceived regarding word processing and internet skills, with over 45% of the students reporting to perceive their skills in this regard as excellent. Slightly lower perceptions of possessing excellent spreadsheet and email skills were reported (26% and 31% respectively). With reference to presentation, almost two thirds of the respondents indicated to perceive to possess excellent to good presentation

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skills. Internet and spreadsheet were perceived as the only ICT skills in which respondents have no capability (8% and 1% respectively).

In addition to the ICT skills, students were asked to also state their perceived level of ability to engage in online discussions, chatting and using computer software to work on their assignments. Findings are presented in the tables that follow. Categories in these tables were represented on a scale of 1 to 4 where 4 means 'excellent', 3 'good', 2 'poor' and 1 means 'no perceived capability'.

4.2.2 Online discussions

Students were asked to rate themselves on a scale of 1 to 4, as pointed out in the above paragraph regarding their perceived ability to engage in on-line discussions. Results are presented in Table 4.1.

Table 4.1:   Students' perceived ability to engage in on-line discussions

Category	n	Cumulative Count	%	Cumulative %
1	7	7	9	9
2	20	27	27	36
3	38	65	51	86
4	10	75	13	100

Almost 51% of the 75 students who answered this question indicated that they perceived themselves to possess good ability to engage in online discussion groups with other students. Only slightly over 9% of students indicated that they do not perceive themselves to possess ICT skills to engage in discussion groups.

4.2.3 Chatting

Students were asked to rate themselves on a scale of 1 to 4 regarding their perceived ability to use on-line chat platforms (item 9.6). Results are presented in Table 4.2.

Table 4.2:   Students' perceived ability to chat online.

Category	n	Cumulative Count	%	Cumulative %
1	8	8	11	11
2	22	30	31	42
3	31	61	44	86
4	10	71	14	100

Students' perceived abilities to chat online are reported to be well below 50%. In this case, the highest ranked category was good (just over 43%), poor (just under 31%) and excellent (slightly over 14%). Whereas no capability (just over 11%) to engage in a chat online was the least ranked. The findings from Table 4.2 do not give clear enough indications to position the perceived online chatting abilities of third-year student teachers as all categories are ranked below 50%.

4.2.4 Computer applications

Question 9.8 asked students to rank themselves on a scale of 1 to 4, regarding their perceived abilities to complete assignments using different computer applications. Results are presented in Table 4.3.

Table 4.3:   Students' perceived ability to use computer applications to
              complete assignments

Category	n	Cumulative Count	%	Cumulative %
1	1	1	1	1
2	4	5	5	6
3	47	52	63	69
4	23	75	31	100

In general, the perceived ability of student teachers to complete assignments
using different computer applications appeared to be good. Students stated that
they have good (slightly under 63%) and excellent (slightly fewer than 31%)
abilities to complete assignments using computer applications, whereas only just
over 5% and 1% respectively perceived themselves to possess poor and no ICT
abilities.

**4.3   What perceived purpose(s) are ICT skills used for as viewed by third-
        year student teachers at the Caprivi College of Education?**

4.3.1 Students' perceptions of the purpose of ICT

Verifying the perceptions of students regarding the use of ICT is problematic as
one cannot directly observe the purpose for which students use ICT. One option
is to ask students to rank themselves in terms of their own purposes for using
ICT. Question 8 on the questionnaire asked students to rate themselves on a
scale of 1 to 5 in the categories for the purposes of using ICT. A summary of the
findings is presented in Table 4.4 below.

Table 4.4:   Third-year students' perceptions of the purpose for which ICT is
             Used for?

Purpose	N	Very often n (%)	Often n (%)	Sometimes n (%)	Rarely n (%)	Not at all n (%)
Informative	72	37 (51%)	25 (35%)	10 (14%)	0 (0%)	0 (0%)
Functional	73	21 (29%)	30 (41%)	16 (22%)	4 (5%)	2 (3%)
Creating	71	11 (15%)	19 (27%)	25 (35%)	12 (17%)	4 (6%)
Communication	71	12 (15%)	9 (25%)	21 (30%)	18 (13%)	11 (17%)
Entertainment	69	8 (12%)	7 (10%)	15 (22%)	17 (25%)	22 (32%)

The questions concerning the perceived purpose of using ICT were responded to
on a five-point scale, with 5 representing 'very often'; 4 representing 'often (twice
or more a week)'; 3 representing 'sometimes (a few times a month)'; 2
representing 'rarely (once in several months)'; and 1 representing 'not at all'. The
questionnaire (see Annexure A) included explanatory notes for each purpose.
This helped students to understand what each ICT purpose entailed.

In general, third-year student teachers reported good usage of ICT for functional
purposes. Thirty-seven third-year student teachers (51%) reported that they very
often use ICT for informative purposes. In this study, informative purposes
implied that ICT is used by student teachers to find and acquire information for
learning. Second to an informative purpose, thirty third-year student teachers
(41%) reported that they use ICT often (twice or more a week) to manipulate
existing information for educational purposes. Lower figures were reported by

students for using ICT for communication (15%) and entertainment (12%) purposes respectively.

Table 4.4 therefore indicates higher scores for purposes of educational use, whereas lower scores are indicated for non-education purposes, such as communication and entertainment. In summary, it appears that third-year student teachers at the Caprivi College of Education use ICT more for informative, functional and creative purposes rather than for entertainment. Apparently students perceive these three purposes as more educational compared to entertainment purposes. In this context, entertainment use of ICT may be perceived by third-year student teachers at the Caprivi College of Education as meant for purposes of leisure and therefore as less likely to be used.

4.4 What perceived learning strategies do third-year student teachers at the Caprivi College of Education adopt while using ICT?

4.4.1 Students' perceptions of learning with ICT

The use of ICT in teaching and learning may be too complex to determine in a once-off cross-sectional survey as in this study. To determine students' perceptions of their beliefs and attitudes, and how these might change over time, will require a longitudinal study. This is partly because beliefs and attitudes need time to change and cannot be determined over short periods of time unless drastic interventions occur. To find out how students currently perceive their learning where ICT is used, they were asked to rank themselves on a scale of 1 to 4 on the question (item 11.1 in the questionnaire) whether they perceive themselves to be learning with ICT.

Categories used for ranking were as follows: 4 represented 'definitely agree'; 3 represented 'agree'; 2 represented 'disagree'; and 1 represented 'definitely

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disagree'. The answers were calculated as percentages in each category and are presented by means of a histogram (see Figure 4.3) that follows.
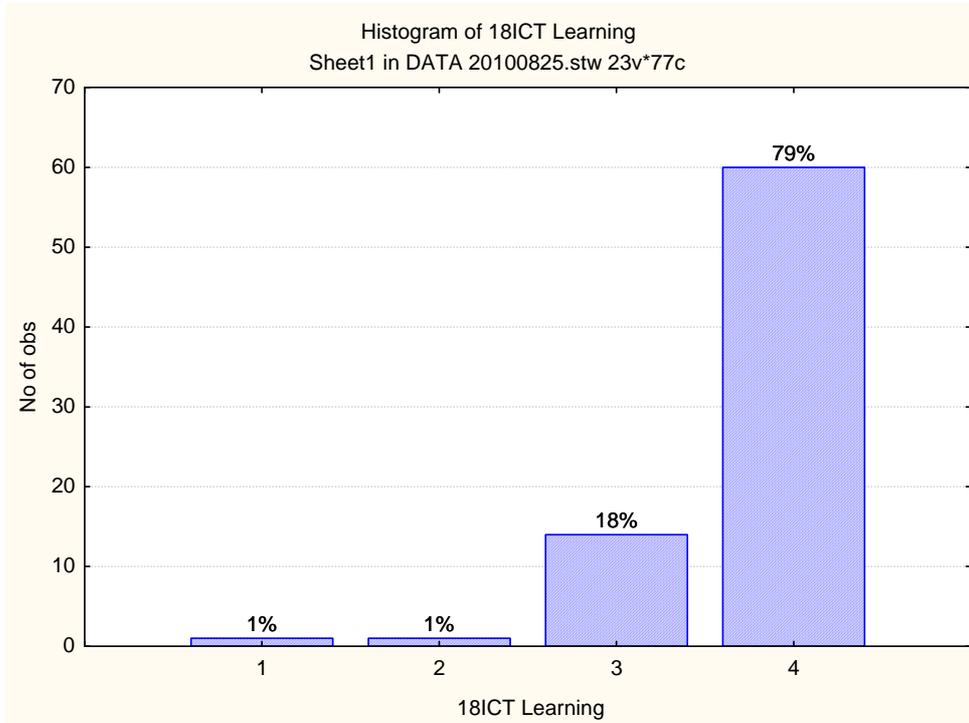
Figure 4.3: Students' perceptions of learning with ICT

Figure 4.3 indicates that a high proportion of third-year students (79%) definitely agree that they were learning with ICT. Another 18% agreed in this matter and it seems as if students overwhelmingly agree that ICT enhances their learning.

Other variables related to ICT application of third-year student teachers in education were cross checked. This finding was compared with responses from students being asked to state their level of agreement or disagreement to studying with computers (SwC). The results are represented in Table 4.5.

Students were asked to state their level of agreement or disagreement with regard to their perceptions of studying with computers on a scale of 1 to 4. Results are presented in Table 4.5.

Table 4.5 Students' perceptions of studying with computers

Category	n	Cumulative Count	%	Cumulative %
Definitely disagree	2	2	3	3
Disagree	7	9	9	12
Agree	21	30	27	39
Definitely agree	46	76	61	100

Table 4.5 reveals that high proportions of students (88%) agree or definitely agree that studying with computers enhances their learning. This clearly corresponds with the findings shown in Figure 4.3.

4.4.2 Students' perceptions of integrating ICT into their subjects

In question 6 on the questionnaire students were asked to indicate whether the application of computers and ICT-related facilities in their subjects (such as majors, minors in area of specialisation and core subjects) enhances the quality of their learning. The question was divided up into two categories for yes 'Y' or no 'N'. The 'Y' answers represented the perceptions of those third-year students who would agree that integrating ICT and computers into subjects enhanced their learning, whereas 'N' represented perceptions of those students who would judge that the integration of ICT in subjects does not enhance the quality of learning. Findings from this question are presented in Table 4.6.

Table 4.6: Students' perceptions of integrating ICT into subjects

Category	n	Cumulative Count	%	Cumulative %
Y	45	45	59	59
N	31	76	41	100

When students self-questioned their preferences regarding the use of ICT in subjects, I expected NetGen (Internet Generation) students to prefer subjects in which technology is integrated. This finding reveals that more third-year students (almost 60%) agree that the integration of ICT into subjects enhances the quality of their learning, whereas almost 41% of the students perceived ICT integration in subjects not to enhance the quality of learning. In order to validate the perceptions of those students, an experimental study would have been ideal, but this did not fall within the parameters of my study. However some implications of this finding will be discussed in the next chapter.

4.4.3 Students' perceptions of learning with Traditional Learning Methods (TLM)

Question 11.5 in the questionnaire asked students to indicate their perceived preferences concerning studying with traditional education methods rather than with ICT. In this context, a traditional learning method is regarded as learning with books and chalkboard. Students were asked to state, on a scale of 1 to 4, whether they preferred learning with traditional learning methods only. Categories were interpreted as follows: 4 represented 'definitely agree'; 3 represented 'agree'; 2 represented 'definitely disagree'; and 1 represented 'disagree'. The results are presented in Figure 4.4.
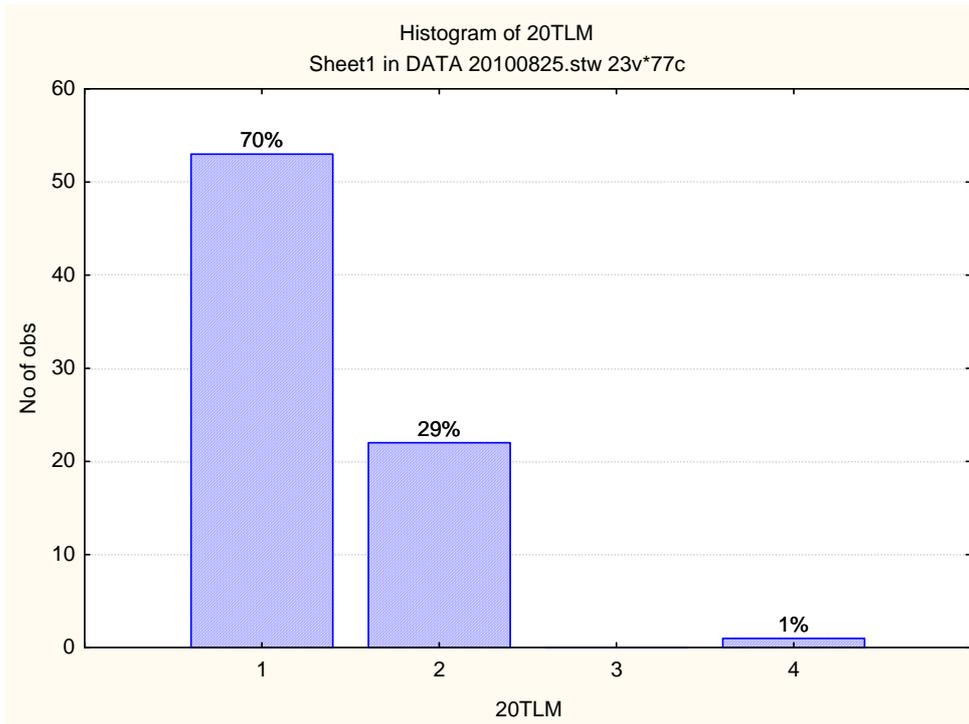
Figure 4.4:   Students' perceptions of Traditional Learning Methods.

Findings from this question reveal that 97% of of the respondents definitely disagreed or disagreed about studying or learning with traditional learning methods rather than with ICT. Only 1% of the respondents perceived traditonal learning methods as an appropriate method for studying. These findings corresponded with the findings presented in Figure 4.3 where only 2% of student teachers indicated negative perceptions about learning with ICT.

4.5   Does age play a role in third-year students' perceptions of using ICT in learning?

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4.5.1 Relationship (association) between age and studying with computers

In an attempt to explore somewhat deeper into why some third-year student teachers perceive the use of ICT as influencing their learning, the relationship between age (Question 2) and studying with computers (Question 11.2) was

investigated. The implications of these findings will be elaborated upon in Chapter 5. The aim was to establish whether the age of third-year student teachers might influence their perceptions of studying with computers. Spearman's correlation coefficient was used to determine the relationship between age and third-year students' perceptions of studying with computers (SwC). These findings are presented in Figure 4.5.
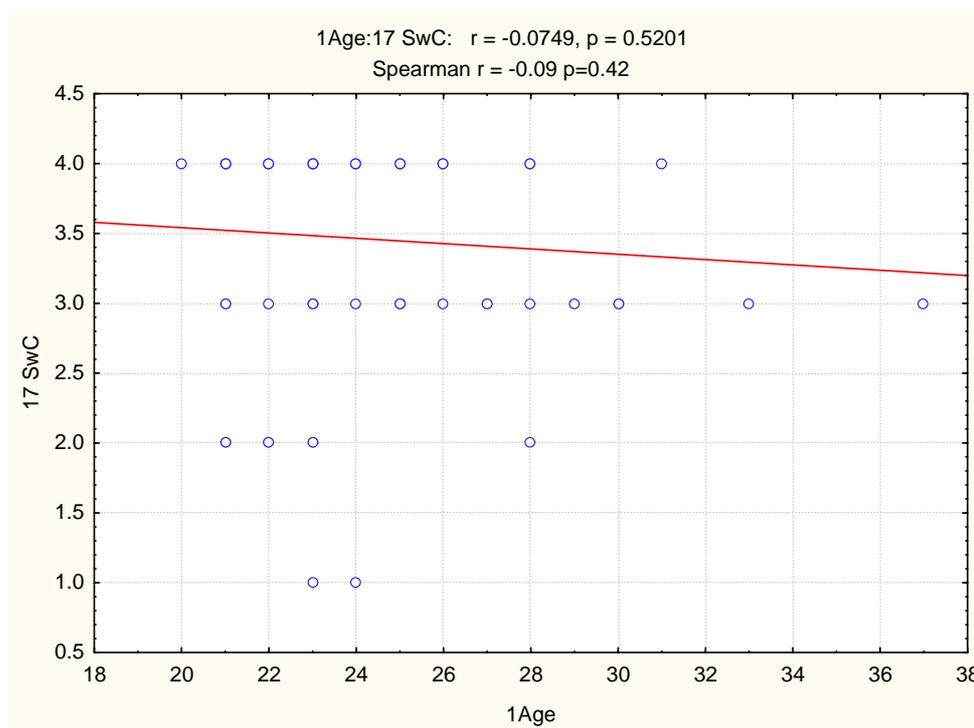
Figure 4.5: Relationship between age and studying with computers

Figure 4.5 shows a negative correlation (-0.09) between age and studying with computers. When age is increasing, the perceptions of third-year student teachers concerning studying with computers tend to decrease slighlty. The p-value was not discussed because the study was aimed at finding statistical significance in the relationship between the two ordinal variables.

4.5.2 Relationship between age and traditional learning methods

To examine the relationship between age (Question 2) and traditional learning methods (Question 11.5) the Spearman correlation coefficient was also calculated. Findings are presented in Figure 4.6.
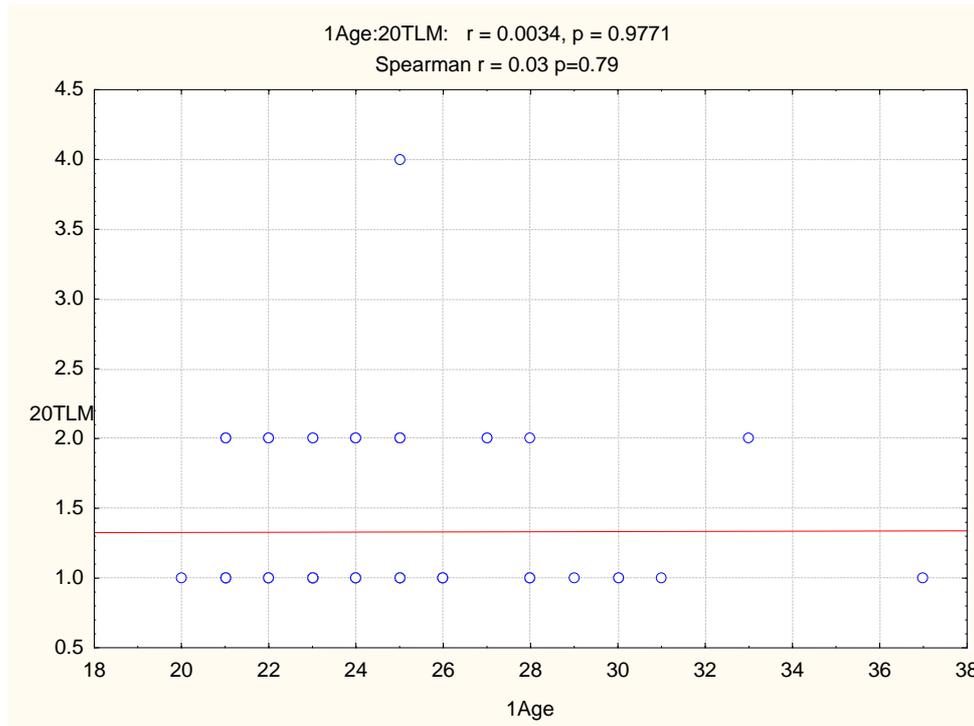
Figure 4.6: Relationship between age and traditional learning methods

Findings indicate that the Spearman r (correlation) is 0.03. When the Spearman r is 0 it means that there is no relationship between two variables. In this case, at the correlation coefficient of 0.03 there seems to be no relationship between age and traditional learning methods.

4.5.3 Relationship between age and learning with ICT

Spearman's correlation coefficient was used to examine the relationship or association between age (Question 2) and learning with ICT (Question 11.7). Findings are presented in Figure 4.7 next.
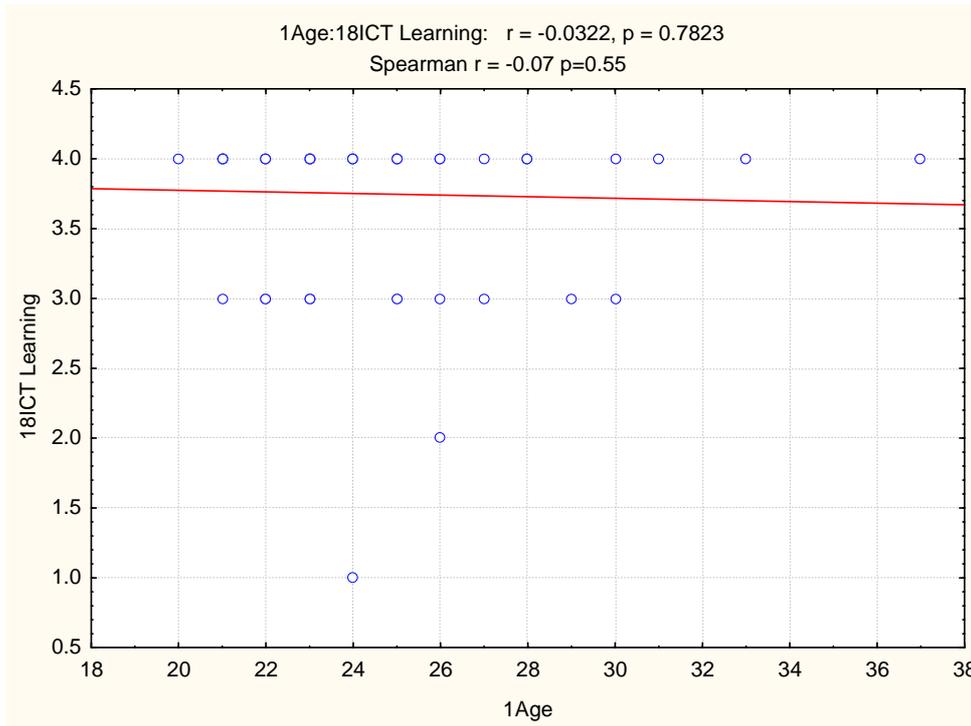
Figure 4.7:   Relationship between age and learning with Information
              Communication Technologies (ICT).

The data in this instance indicated slight negative correlation (-0.07) between age
and learning with ICT. When age is increasing, third-year student teachers
perceptions to learning with ICT tend to slighlty decrease.

4.5.4 Relationship between subject integration and traditional learning methods

To examine the relationship or association between subject integration (question
6) and traditional learning methods (Question 11.5), a Chi-squared test was
done. Calculations were based on the two-way cross-tabulation of subject
integration and traditional learning methods as variables. Findings are presented
in Table 4.7.

Table 4.7: Relationship between subject integration and traditional learning
methods

Subject Integration	Marked cells have counts > 10. Chi-square (df = 2) = 1.99, p =.37055			
	TLM 1	TLM 2	TLM 4	Row Totals
Y	31	14	0	45
Row %	69%	31%	0%	
N	22	8	1	31
Row %	71%	26%	3%	
Totals	53	22	1	76

As can be seen from Table 4.7, the value of the Chi-squared test was 1.99; degree of freedom (df) for this test was 2; and the corresponding p-value was .37055. No evidence thus was found of any significant relationship between ICT subject integration and traditional learning methods (since p > 0.05).

4.6   Students suggestions on how the Caprivi College of Education could support them in their use of ICT for learning

Third-year student teachers were asked to suggest the kind of institutional ICT support from the college that they perceived might enhance their learning. Findings were grouped according to possible categories such as access, facilities, training and technical support. The findings reveal that ICT facilities (44%) and access to ICT (27%) were indicated by students as areas where support is needed most. Training and technical ICT support were least indicated (18%) and (11%) respectively.

4.7   Summary

In this chapter, the descriptive quantitative results of the study have been presented. Data was presented and analysed regarding third-year students' perceptions of the use of ICT in teaching and learning at the Caprivi College of Education. The chapter that follows will discuss the findings reported in Chapter 4 in relation to the literature and will attempt to draw a number of conclusions from the study. It will also point out implications for the use of ICT towards learning for students at the Caprivi College of Education.

CHAPTER 5

DISCUSSION OF FINDINGS, CONCLUSIONS AND IMPLICATIONS

Introduction

This chapter mainly discusses the findings from the empirical part of the study as presented in Chapter 4. These findings are discussed in relation to the literature study presented in Chapter 2 and conclusions regarding the study are drawn. Some implications of the use of ICT in college students' learning at the Caprivi College of Education are also pointed out, while some of the limitations encountered in this study are alluded to.

5.1   Discussion

Empirical findings and further perspectives which were derived from the literature review are discussed next.

5.1.1 Discussion of empirical findings

As pointed out in Chapter 1 (paragraph 1.3), the purpose of this study was to investigate the perceptions held by third-year students of the possible effect of ICT application on their learning in one teacher education College in Namibia. In order to investigate how students perceived the use of ICT in learning, a non-experimental design using a limited questionnaire survey was thought suitable for this study. Data were collected by means of using closed-ended questionnaires.

The questionnaires were administered to third-year student teachers. As the study represented a once-off cross-sectional investigation, its findings are only

applicable to the context related to third-year student teachers at the Caprivi College of Education in Namibia.

Descriptive statistics using frequencies presented in tables and histograms was used in this study, while the Chi-square test and the Spearman correlation coefficient were employed to determine the influence and relationship between limited chosen variables. Statistical significance was not calculated, as it was not within the parameters of this study. A discussion of the findings regarding third-year students' perceived ICT skills follows.

5.1.1.1   What perceived ICT skills do third-year student teachers at the Caprivi College of Education possess?

Findings regarding perceived ICT skills reveal that third-year student teachers possess generally good skills in using word processing, spreadsheet, email and the internet and presentation software (cf. paragraph 4.3.1, Figure 4.2). The students' positive perceptions of ICT applications to enhance their learning might be attributed to Namibia's ICT policy in education regarding the application of technology at all levels of the education sector. The Development level 4 requirements of Namibia's ICT policy point out that "all pre-service student teachers should be able to use a computer, communicate by e-mail, find information using web-based systems, create output using a word processor, spreadsheet and presentation software, e.g. assignments" (MEC 2005:7). With the evidence from the findings in this study and Namibia's ICT policy (developmental level 4) it seems that high proportions of third-year student teachers at the Caprivi College of Education can indeed be regarded as Internet Generation (Net Gen) students. Literature asserts that today's students are digital, connected, and social and prefer learning that includes peer-to-peer interaction. They also prefer to be actively engaged in their learning and prefer learning resources that are visual and relevant. These students appear to interact and engage in discussions with their peers and teachers on-line and in the

process acquire ICT skills and abilities that are needed in the use of ICT to enhance their learning.

These findings are supported by my experience as a college lecturer, since in-house regulations and procedures at the Caprivi College of Education encourage students to type their assignments and present them orally (cf. Table 4.3) and/or involve themselves in discussions (cf. paragraph 4.3.2) using ICT. Students have responded quite positively in this instance. In addition to in-house regulations and procedures, the Integrated Media and Technology Education (IMTE) course that aims to teach students ICT skills may have also contributed to the students' positive perceptions regarding ICT skills.

Although the students' perceptions were overwhelmingly positive about using ICT in order to enhance their learning, there clearly were also a number of students with a lack of ICT abilities like engaging in online chatting (cf. paragraph 4.2.3). As Manathunga and Donnelly (in Donnelly & McSweeney, 2009) point out, age plays a role in the use of ICT in learning; older students may tend to have negative perceptions of using ICT for learning, compared to younger students who are identified as Net Gen (Internet Generation).

The findings in paragraph 4.5.3 seem to be supported by literature (Manathunga & Donnelly in Donnelly & McSweeney, 2009) which indicates that, as the age of student teachers increases, their positive perceptions of learning with ICT decrease. In addition, my experience is that older students' perceptions of the use of ICT in learning are influenced by the environments in which they were taught at school level. It is likely that ICT was not used in their learning in those environments, therefore, new learning environments at a college where ICT is used might be challenging, resulting in negative perceptions of ICT.

The findings further indicate (cf. paragraph 4.5.2) that there is no relationship between age and perceptions regarding traditional learning methods (see Figure

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4.6). Even when the age factor increases, students' perceptions of traditional learning methods seem to remain constant. This implies that third-year student teachers at the Caprivi College of Education may perceive new learning methods as enhancing their learning positively, regardless of how young or old they might be.

5.1.1.2 What purpose(s) are ICT skills used for as viewed by third-year student teachers at the Caprivi College of Education?

Students were asked to rank themselves regarding the perceived purpose(s) of using ICT (see Table 4.4). Findings in this regard suggest that third-year students perceived the use of ICT as for informative and functional purposes, whereas communication and entertainment purposes were perceived as lower ranking. Most students agreed on having very often used ICT in order to find, acquire and use information which is of an educational nature. This implies that students rarely spend time using computers for entertainment, e.g. listening to music or watching videos.

The literature (Van der Westhuizen in Gravett & Geyser, 2004; Ehrmann, 2002) indicates that the power of the internet in education is its ability to host huge amounts of information to which students may refer and which they may use to enhance their learning. The ever-present availability of electronic books, journal articles, newspapers, magazines and educational materials seems to make the Internet a widely acceptable resource and a support tool for students. It might therefore be perceived by students to enhance deeper forms of learning. The literature (Van der Westhuizen in Gravett & Geyser, 2004; Czerniewicz & Ng'ambi, 2004) refers to this as learning just-in-time at any place because students access information at times when they need it, regardless of the place where they find themselves or the support from their peers and teachers. In this sense, the use of ICT in education seems to enhance student learning positively.

Findings from this study also indicate that students reported using ICT to manipulate existing information, as well as to compose, compile and produce new information (cf. paragraph 4.4.1). Many students indicated that they often use ICT to write assignments, do research, make presentations and use accessed information to prepare for tests and examinations (cf. paragraph 4.4.1 and Figure 4.2). These activities that students engage in seem to be favourably supported as the literature points out that accessing, reading, communication, application and synthesis are among the activities students engage in while using ICT as a learning device (Czerniewicz & Ng'ambi, 2004). These activities carried out by students signal important roles that the use of ICT in higher education plays to enhance the quality of student learning.

Although the literature (Turoff, 2000; Bitzer in Gravett and Geyser 2004) points out that communication (involving collaboration and/co-operation) is an important and a frequent activity that students engage in, findings from this study indicate the opposite. A high percentage of third-year student teachers at the Caprivi College of Education indicated that they only sometimes communicate by using ICT (cf. Table 4.4). In this instance, one might assume that students rather resort to face-to-face contact with their peers and teachers. A further finding on the purpose of ICT (cf. paragraph 4.4.1) indicates that students rarely or never use ICT for entertainment. This, contrary to expectation, means that ICT very often is used by students for educational purposes (both informative and functional). It may thus be argued that students' perceived use of ICT for educational purposes is influenced by the value that students attach to ICT as a source of learning and mastering course objectives.

5.1.1.3 What perceived learning strategies do student teachers at the Caprivi College of Education adopt while using ICT?

Third-year student teachers were asked to indicate to agree or disagree regarding their perceptions of using ICT as a learning strategy. Findings in this

regard (see Figure 4.3) indicate that students overwhelmingly agreed that learning with ICT enhances their strategies in engaging in learning. Corresponding findings in this study (see Table 4.5) indicate that students also agreed that studying with computers enhances learning approaches. Literature (Donnelly & McSweeney, 2009) reminds us that the use of ICT and related materials in learning must consider appropriate learning approaches and practices to enhance learning. In this instance, the literature refers to the fact that the use of ICT must be aligned with the so-called learning paradigm (Barr & Tagg, 1995) and encourage the learning, rather than the teaching paradigm.

My experience as an ICT teacher, and evidence from the literature consulted suggest that ICT alone cannot enhance the quality of teaching and learning. Although students use ICT for learning, they must be given opportunities for regular face-to-face contact with their teachers. This is because learning is a social human activity and requires the role of a teacher or knowledgeable others as facilitators of the learning process.

Students' positive perceptions of learning with ICT and studying with computers may also be influenced by the fact that learning with ICT is self-paced, interactive and reflective. While students learn with ICT and study with computers, literature (McConnell, 2000; Bitzer in Gravett & Geyser, 2004) posits that opportunities for collaboration and/or co-operation among students seem to be necessary to enhance learning (see Table 2.3). What further supports this point is that, in my experience, student teachers easily collaborate and/or co-operate when they are in online discussion groups, as long as they have access to Internet facilities. For example, in a discussion forum created on facebook for third-year students to engage in online discussions, the discussions, arguments and questions were presented by students. My role was simply to facilitate the discussions, controlling and advising those students who advanced irrelevant issues to refrain from such practices.

The use of ICT in learning in higher education has been received with mixed feelings by both students and teachers (Manathunga & Donnelly, 2009). In this study, students were asked to indicate their perceptions of integrating ICT in their course subjects such as major, minor and core subjects in the BETD programme. Findings in this regard (see paragraph 4.5.2) indicated mixed or split perceptions, with the majority of students indicating that integrating ICT in their course subjects did indeed enhance their learning. This may pose a challenge to the college as quite a number of students perceive that integrating ICT in their subjects does not enhance their learning. What further supports this point is that findings on students' perceptions about integrating ICT with their course subjects and using traditional learning methods showed no relationship (cf. Table 4.7). This implies that, although ICT is integrated into course subjects and/or used to discourage traditional learning methods, student teachers may still perceive the use of ICT as an isolated medium and not clearly related to enhancing their learning.

5.2.2 Further perspectives which were derived from the literature review

To fill the gap(s) that exist between students' perceptions regarding ICT integration in subjects, the literature (Koohang *et al.*, 2009) suggests a blended approach to learning, as such an approach represents constructivist perspectives on learning. In a blended approach, best features of ICT and classroom teaching are combined to enhance learning. My experience of using a blended approach is that the needs of individual students are attended to; learning resources become available 24 hours a day; and learning is not limited to the classroom. Literature (Taylor, 2000) in this instance argues that a blended learning approach encourages flexible learning environments, which seem to be favoured at institutions for higher education.

In flexible learning environments, students (who agree and disagree with the integration of ICT in their course subjects) benefit from multiple strategies,

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methods and delivery systems which are employed to enhance learning. The literature (Taylor, 2000; Saunders & Werner, 2002; Van der Westhuizen in Gravett & Geyser, 2004) indicates that learning will be enhanced if some elements of learning are facilitated online and others in a classroom. Adopting a blended approach to learning may enhance learning opportunities presented in online and/or classroom learning.

Findings in this study indicated that an overwhelming majority of third-year student teachers disagreed that learning by using traditional learning methods alone enhances their learning (cf. Figure 4.4). In this context, traditional learning methods are regarded as learning that is mainly associated with books and chalkboards. The literature (Brown, 2000) posits that traditional learning methods encourage students to adopt surface approaches to learning, which is not desirable in higher education. The negative perceptions of learning through traditional learning methods only mean that there is a need to have a hybrid of ICT and traditional learning methods so that students are provided with opportunities to engage in deep learning.

The question of the role of ICT in the assessment of learning also raises interesting and important perspectives. One perspective is that assessment and student learning should not be isolated from each other. In this context, the literature (e.g. Laurrilard, 1993) emphasises that ICT application in students' learning should be aligned to assessment. Although assessment was not included as an item on the research instrument for this study, reviewed literature in Chapter 2 (e.g. Beets in Bitzer, 2009; Laurrilard, 1993; Koohang, 2009; Geyser in Gravett & Geyser, 2004; Biggs, 1999) indicates that assessment, teaching and learning are integral, should be aligned, and that one cannot be planned or discussed in isolation from the others. In this instance, assessment in relation to ICT application in learning will be briefly referred to.

Several challenges (misunderstanding of integrated assessment, constructive alignment of assessment and positive backwash) to assessment practices in higher education are noted in the literature (Beets in Bitzer, 2009; Biggs, 2003; Barr & Tagg, 1995; Geyser in Gravett & Geyser, 2004). These challenges allude to the challenge of using ICT for assessment purposes in higher education. The literature points out that development in the use of ICT to support assessment in higher education is moving at a slow pace. In this case, more development in ICT integrated assessment is focused on assessment *of* learning rather than assessment *for* learning. The literature (Geyser in Gravett & Geyser, 2004; Kvale, 2007) asserts that assessment *for* learning is important in higher education and is something that might enhance deep learning.

Finally, it seems that ICT applications in learning come with barriers which pose challenges to higher education institutions. The literature (Ertmer, 1999; MEC, 2005; and Goktas, Yildrim & Yildrim, 2009) acknowledges these barriers and indicates that they are regarded as obstacles in the use of ICT to enhance learning. My experience as an ICT teacher is that scheduled learning sessions where ICT should be used at times fail to take place. The failure of the learning session may occur as a result of several factors, such as number of computers in relation to the number of student teachers; internet speed and connectivity; inadequate technical support; and inadequate training of students. If these factors are not attended to and resolved amicably, students may develop negative attitudes to and perceptions of the use of ICT in their learning.

Conclusions drawn from the findings of this study are discussed next.

5.3   Conclusions

Based on the empirical and literature findings in this study, a number of conclusions might be drawn.

Firstly, findings from the study suggest that third-year student teachers at the Caprivi College of Education have positive perceptions regarding their ICT skills and related computer applications. As a result of these positive perceptions, students also perceive the use of ICT as enhancing ICT skills that possibly encourage them to engage in deeper forms of learning. It also seems that a variable such as age plays a role in influencing the perceptions of student teachers regarding the use of ICT in learning. In particular, it seems that third-year student teachers who are chronologically younger perceive the use of ICT in education to enhance their learning more positively, compared to older student teachers.

Secondly, the study found that third-year student teachers agree that the use of ICT in their major, minor and core subjects in the BETD programme possibly encourages them to engage in deeper forms learning. These positive perceptions seem to be attributed to the fact that most third-year student teachers are chronologically younger and therefore perceive themselves as possessing good ICT skills, which are necessary for effective learning in higher education.

Thirdly, findings from this study further suggest that third-year student teachers at the Caprivi College of Education have negative perceptions of studying or learning through traditional learning methods only. What further supports this conclusion is that a majority of third-year student teachers have positive perceptions about using ICT in their learning and it seems that students more readily use ICT for informative and functional purposes which appear to be of educational value and might enhance deeper forms of learning.

5.4 Implications of study

Implications from this study relate in two ways, firstly the implications for practice and secondly implications for further research. These implications are discussed separately next.

5.4.1 Implications for practice

At least two implications for educational practice at the Caprivi College of Education emerged from this study.

Firstly, ICT skills training for student teachers emerged as an important institutional issue. To maintain and develop the ICT skills of student teachers as revealed in the findings of this study, the Caprivi College of Education might need to avail opportunities for students to train at intermediate and advanced levels in ICT skills. At intermediate and advanced levels of ICT skills, the students' perceptions of the ICT skills that they possess will probably be enhanced further. This implies that students might feel more confident as ICT users and apply word processing, spreadsheet, Internet and e-mail, presentation and other related computer applications to boost their learning.

In addition, the use of ICT in learning at the Caprivi College of Education would entail increased support for student teachers to access ICT facilities. Student teachers need continuous and unlimited access to ICT facilities and related materials if learning is to be enhanced. The ICT support could be provided by institutional leaders, staff members and lecturers, peers and fellow student teachers. An increase in ICT access for student teachers implies that the Caprivi College of Education will probably need to consider a drastic budget increment to finance ICT facilities, peripherals and services (Internet and technical).

5.4.2 Implications for further research

This study only touched on the students' perceptions of the use of ICT in their learning. Future studies regarding the use of ICT in learning may be directed at evaluating the IMTE course in the Basic Education Teacher's Diploma (BETD) Programme at other teacher's colleges in Namibia. A future study may also

establish the relevance and the role of the IMTE course in enhancing the ICT skills of education students.

Furthermore, research in the use of ICT in assessment *for* learning and *of* learning seems to be necessary. There is a clear need to explore this topic in greater depth for two reasons. Firstly, assessment in higher education in Namibia is under-theorised and not well understood. Therefore its implementation in higher education, including at the Caprivi College of Education, is weak. Secondly, the use of ICT to support assessment is underdeveloped and there is a need to research relevant ICT applications that may enhance assessment practices.

5.5   Limitations of the study

A number of challenges referred to as limitations were encountered in this study. The first limitation was the use of closed-ended questionnaires as research instrument. This limited the collection of detailed data from student teachers. When collecting information about people's beliefs, attitudes, opinions and feelings, it is important to use a research instrument that allows respondents to express more than what is thought of by the researcher (Slavin, 2007). In this study, the closed-ended questionnaire limited opportunities for student teachers to express their perceptions fully. Closed-ended questionnaires were used in this study because of the time that was available for its execution and the ensuing convenience of working with answers from respondents which were pre-coded and quantified.

Another limitation encountered in this study was that the survey instrument was not thoroughly pilot tested. Reasons for failure to properly pilot the questionnaire have been discussed in Chapter 3 (see paragraph 3.3.1). If piloting of the questionnaire was done properly, it might have enhanced the reliability of the research instrument to collect data for this study.

The last limitation encountered in this study was that examining and determining perceptions in a once-off cross-sectional study may be problematic. This is because attitudes, beliefs, feelings and opinions of people are not static, and given time, these perceptions might change (Slavin, 2007; McMillan & Schumacher, 2001). To avoid this, a longitudinal study, as discussed in Chapter 3 (see paragraph 3.1) could have been ideal. In the context of the above discussion, carrying out a once-off cross-sectional study posed as a limitation in this survey.

5.6   Conclusion

Findings on third-year students' perceptions about the use of ICT in learning in relation to literature were discussed in this chapter. Conclusions were drawn from the study and implications of the use of ICT in college students' learning at the Caprivi College of Education, as well as for further research, were pointed out. Limitations encountered in the study were also referred to.

Although the use of ICT is not a panacea for higher education students' learning challenges, ICT is well positioned within institutions of higher education in Namibia, including the Caprivi College of Education. To be able to function as 21st century citizens who are knowledgeable, skilled, productive and life-long learners, students should maximise opportunities provided by ICT to promote their own learning. If institutions of higher education are to realise their dreams of producing these 21st century citizens, attention to factors such as access to ICT facilities, financing ICT and keeping abreast with innovative ICT developments are not to be set aside or deferred to tomorrow.

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Survey Questionnaire

Third-year students' perceptions of the use of ICT at a teachers' training college in Namibia.

Dear fellow student

Technological environments and demands of the new teaching/learning paradigms have paved the way for teacher education institutions to use ICT to enhance the quality of student learning. This research aims to investigate the perceptions of third year students at Caprivi College of Education on the possible effect of ICT application on learning.

Your answers to these questions will be of great benefit in helping to shape the the use of ICT in teacher education and will be kept confidential and solely used for the purpose of this research.

Thank you for giving me your valuable time to complete this questionnaire.

Allen M. Chainda
Student, MPhil in Higher Education
University of Stellenbosch, South Africa

Please mark boxes with a cross where applicable ⊠

Please mark boxes with a cross where applicable ☒

Q1. What is your gender?   Male ☐   Female ☐

Q2. What is your age?   ☐

Q3. What is your ethnicity? (Please choose one only)

Caprivi	Kavango	Owambo	Herero	San	German	Coloured	Afrikaaner	Nama/Damara
☐	☐	☐	☐	☐	☐	☐	☐	☐

Q4. How many years have you been using computers?   ☐

Q5. **Did you previously do any course on computers before being admitted in the BETD program?**   YES ☐   NO ☐

Q6. Please indicate whether you use computer applications and other ICT related facilities in your classes or subjects at the college.

☐ YES   ☐ NO

Q7. If Q6 is YES, indicate which classes or subjects do you use computers and related ICT at the college. You may tick more than one of the options below.

☐ Human Movement Education   ☐ English Communication Skills

☐ Silozi Language Education   ☐ English Language Education

☐ Social Science Education   ☐ Mathematics Education

☐ Natural Science Education   ☐ Agricultural Science Education

☐ Arts in culture   ☐ Education Theory and Practice

☐ Integrated Media & Technology Education

☐ Other(s) specify

_____

Q8. For what purpose and how frequently do you use ICT at the college?

Purpose	Very Often (everyday)	Often (twice or more a week)	Sometimes (a few times a month)	Rarely (once in several months)	Not at all
Informative: e.g. to find, acquire and use information for educational purposes.	☐	☐	☐	☐	☐
Functional: e.g. to use and manipulate existing information for educational purposes using existing information (compile lists of reference, educational materials, use accessed information to prepare for test, examinations, assignments and research)	☐	☐	☐	☐	☐
Creating: e.g. to compose, compile, produce new					

	Excellent	Good	Poor	No capability	
information (write assignments, draw and paint, make PowerPoint presentations, give oral presentations, prepare newsletter, create own webQuest, etc.)	☐	☐	☐	☐	☐
Communication: e.g. to exchange and to transmit information with other students, teachers and others using email and Internet; to join discussion forums and chats	☐	☐	☐	☐	☐
Entertainment: e.g. to compose audio music, listen to music, watch video, make video clips and play games	☐	☐	☐	☐	☐

Q9. Please indicate your level of skills in the use of the following computer applications.

I. Basic - simple use of applications for purposes other than learning.	Excell-ent	Good	Poor	*No capa-bility*
1. I am able to use word processor to create, edit and format documents for specific purposes.	☐	☐	☐	☐
2. I am able to use spreadsheet to record data, compute simple calculations and represent data in the form of tables and graphs.	☐	☐	☐	☐
3. I am able to email documents.	☐	☐	☐	☐
4. I am able to browse the internet.	☐	☐	☐	☐
5. I am able to use presentation tools (PowerPoint)	☐	☐	☐	☐
6. I am able to use chatting platforms.	☐	☐	☐	☐
Intermediate – use of computer applications for learning purposes both in and outside the classroom				
7. I am able to use applications (word processing, spreadsheet, PowerPoint) for learning.	☐	☐	☐	☐
8. I can use various applications to do assignments, research and projects	☐	☐	☐	☐
9. I am able to use email to collaborate on group assignments and projects with other students, exchange information and ideas and contribute to discussions.	☐	☐	☐	☐
10. I am able to use internet resources to prepare my assignments, projects and research.	☐	☐	☐	☐

Q10. What are your favourite activities using computers? (Indicate as many options as applicable).

☐ Download music

☐ Chat

☐ Email

☐ Surf the internet

☐ Find and research information

☐ Use educational software (Encarta Britannica and PLATO etc.)

☐ Writing or Typing

☐ Drawing and painting

☐ Make presentations using PowerPoint

☐ Playing games

☐ Others, please
specify…………………………………………………………………………………

Q11. Rank the items below on a scale of 1 – 4, 4 being definitely agree, 3 agree, 2 disagree, 1 definitely disagree to indicate your level of agreement or disagreement with the following Information Communication Technologies (ICT).

ITEM	Ranking scale 1 - 4
1. Learning with ICT requires highly developed study skills and strategies.	☐
2. I would like to study with a computer even if it is complicated.	☐
3. I think audio materials can improve my learning.	☐
4. I think video materials can improve my learning.	☐
5. I prefer to study with traditional education methods rather than with ICT.	☐
6. Learning via the internet alone is acceptable to me.	☐
7. I think ICT can improve my learning.	☐
8. I like to learn with ICT because it brings reality in the classroom.	☐
9. ICT allows for effective sharing of information.	☐
10. In general, learning with ICT is time consuming.	☐
11. Information that I find on internet is irrelevant.	☐
12. I prefer to learn alone even if I use educational software.	☐
13. In general, availability and access to ICT provide more opportunities to enhance my learning.	☐
14. I can do science experiments with ICT without handling toxic chemicals.	☐
15. In general I find learning with ICT interesting.	☐

Q12. Do you have any suggestion(s) on how Caprivi College of Education could support student teachers in their use of ICT for learning?

Thank you very much for your time and help. Your views will contribute to my insight on how best and effective to apply ICT into teaching and learning and possibly suggest more appropriate ICT learning strategies in teacher education.

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23 August 2010

Tel.: 021 - 808-9183
Enquiries: Sidney Engelbrecht
Email: sidney@sun.ac.za

Reference No. 328/2010

Ms AM Chainda
Department of Curriculum Studies
University of Stellenbosch
STELLENBOSCH
7602

Ms AM Chainda

APPLICATION FOR ETHICAL CLEARANCE

With regards to your application, I would like to inform you that the project, *Investigating third year students' perception of the effect of the application of ICT on learning at a teachers college in Namibia,* has been approved on condition that:

1. The researcher/s remain within the procedures and protocols indicated in the proposal;
2. The researcher/s stay within the boundaries of applicable national legislation, institutional guidelines, and applicable standards of scientific rigor that are followed within this field of study and that
3. Any substantive changes to this research project should be brought to the attention of the Ethics Committee with a view to obtain ethical clearance for it.

We wish you success with your research activities.

Best regards

MR SF ENGELBRECHT
Secretary: Research Ethics Committee: Human Research (Non-Health)

Afdeling Navorsingontwikkeling • Division of Research Development
Privaat Sak/Private Bag XI • Matieland 7602 • Suid-Afrika/South Africa
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R-2010 15:07 From:CAPRIVI COLLEGE   +264 66 25 3934   To:0218082270   P.2/2

CAPRIVI COLLEGE OF EDUCATION
Private Bag 1096 . KATIMA MULILO . Tel: 066-253422/253930 . Fax: 066-253934

20 April 2010

Dear Professor Bitzer

Permission to carry out research: Mr Allen Chainda

I acknowledge receipt of a letter dated 19 April 2010 from Mr Allen Chainda, one of your students, requesting for permission to conduct research at this College of Education. I have pleasure in informing Mr Allen Chainda that he is most welcomed to do his research at this institution. Mr Allen Chainda is studying on:

Title

Third year student's perceptions of the application of ICT at a Teachers' training College in Namibia.

Purpose

The study is investigating the student perceptions of the possible effect of ICT application on student learning as perceived by students themselves.

Population

This research will involve all third year students. This college has 129 students doing third year level.

Assumptions

The study assumes that findings from it might lead onto possible suggestions for the improvement of the ICT application in teacher education for Caprivi College of Education by identifying ICT and strategies which students use to learn, suggest appropriate ICT tools and teaching/learning strategies which the college may adopt and investigate in the teaching/learning strategies investigate in the teaching/learning process.

With regards to Mr Chainda's application for funding, he should find out from the Ministry as he knows well whom he was dealing with there.

Best regards,

Sincerely

JN Humano
Acting Rector: CCE

(stamp: MINISTRY OF EDUCATION — Caprivi College of Education — 2 0 APR 2010 — P.o Box 1096 Katima Mulilo — REPUBLIC OF NAMIBIA)

Ministry of Education
Private Bag 13186, Windhoek.   Tel: 264-61-307012   Fax: 264-61-309759
Email: lamukoshi@yahoo.com

Enquiries: E. Mbuye

Prof. Britzer
University of Stellenbosch
Department of Curriculum Studies
Center for Higher Education and Adult Learning
R.S.A

Dear Prof Bitzer

PERMISSION TO CARRY OUT RESEARCH: MR ALLEN CHAINDA

This memo services to inform you that your student Mr Allen Chainda has been granted permission to conduct research in the Ministry and other institutions on the Topic 'Third year student's perceptions of the application of ICT at a teachers' training college in Namibia'.

Kindly accept my gratitude for your effort in developing higher education in Namibia.

Sincerely yours
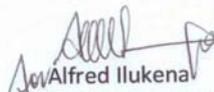
Alfred Ilukena
PERMANENT SECRETARY

0 3 AUG 2010

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STELLENBOSCH UNIVERSITY
CONSENT TO PARTICIPATE IN RESEARCH

Investigating third-year students' perception of the effect of the the use of ICT on learning at a teachers college in Namibia

You are asked to participate in a research study conducted by Allen M Chainda, Mphil in Higher Education student from the Department of Curriculum Studies, Centre for Higher and Adult Education at Stellenbosch University. The results of this study will contribute to the thesis. You were selected as a possible participant in this study because you are a third year student teacher at Caprivi College of Education and eligible to provide information relevant for the study. Secondly, you are part of the population and your participation in the study is important for ICT application in teaching and learning.

1. PURPOSE OF THE STUDY

The purpose of the study is to investigate student perceptions of the possible effect of ICT application on student learning as perceived by students themselves. Findings might lead onto possible suggestions for the improvement of ICT application in teacher education for Caprivi College of Education.

2. PROCEDURES

If you volunteer to participate in this study, we would ask you to do the following things:

1. Read the consent form, ensure that you understand all content in this form.
2. If you are satisfied with the content, please sign the form.
3. Complete a questionnaire that will be given to you.
4. Items in the questionnaire will take you approximately 20 – 25 minutes to complete.
5. A completed questionnaire will then be returned to the researcher.

3. POTENTIAL RISKS AND DISCOMFORTS

No risks are involved in the study or any form of discomfort to participants.

4. POTENTIAL BENEFITS TO SUBJECTS AND/OR TO SOCIETY

Findings from the research will point out at implications for intervention to Caprivi College of Education on ICT application in teaching and learning. Though you are in the final year, findings from the study may be used by college management and leadership to make decision(s) regarding the future of ICT at Caprivi College of Education.

The study will contribute to understanding the perceptions of students regarding the the use of ICT into teaching and learning, specifically to teacher education in Namibia.

5. PAYMENT FOR PARTICIPATION

No payment in any form shall be given to participants in this study. Participation is voluntary.

6. CONFIDENTIALITY

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Participating student teachers will not be asked to write their names, initials, student numbers or any form and/or sign thereof leading to personal identity of the student on the questionnaire. Participants The findings from the study will be presented unanimously without any form of personal identity of the participants in the study.

Data on questionnaires from the participants will be stored in a lockable cabinet in the office of the researcher. Computer analyzed data will be stored on a CD which will be kept by the researcher in a lockable cabinet.

7. PARTICIPATION AND WITHDRAWAL

You can choose whether to be in this study or not. If you volunteer to be in this study, you may withdraw at any time without consequences of any kind. You may also refuse to answer any questions you don't want to answer and still remain in the study. The investigator may withdraw you from this research if circumstances arise which warrant doing so.

8. IDENTIFICATION OF INVESTIGATORS

If you have any questions or concerns about the research, please feel free to contact: Ms. Mbuye Director for Higher Education, Telephone no: +26461307012.

The Rector, Caprivi College of Education: Dr. Bennet Kangumu, Rector of Caprivi College of Education, Telephone no: +26466253422

Further enquiries can be directed to the study supervisor, Prof: Eli Bitzer, Stellenbosch University, Telephone no: +277218082297

9.   RIGHTS OF RESEARCH SUBJECTS

You may withdraw your consent at any time and discontinue participation without penalty.   You are not waiving any legal claims, rights or remedies because of your participation in this research study.   If you have questions regarding your rights as a research subject, contact Ms Maléne Fouché [mfouche@sun.ac.za; 021 808 4622] at the Division for Research Development.

SIGNATURE OF RESEARCH SUBJECT OR LEGAL REPRESENTATIVE

The information above was described to me by Mr. Allen M. Chainda in English and I am in command of this language.   I was given the opportunity to ask questions and these questions were answered to my satisfaction.

I hereby consent voluntarily to participate in this study and I have been given a copy of this form.

_____

Name of Subject/Participant

_____

Name of Legal Representative (if applicable)

_____   _____

Signature of Subject/Participant or Legal Representative   Date

SIGNATURE OF INVESTIGATOR

I declare that I explained the information given in this document to _____ and he or she was encouraged and given ample time to ask me any questions. This conversation was conducted in English and no translator was used.

_____   _____

Signature of Investigator   Date