An Investigation of the Role of Principals in Promoting Computer Usage in Selected Namibian Schools

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Submitted By

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DECLARATION OF ORIGINALITY

I certify that this thesis has not been previously submitted for a degree, nor has it been submitted as part of the requirements for a degree except as fully acknowledged within the text.

I also certify that this thesis is my own work. Any help that I have received with research and the preparation of the thesis itself has been acknowledged. In addition, I certify that all my sources of information are properly referenced.

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Signature of Candidate Date

DEDICATION

This thesis is dedicated to my late, close friend and classmate Elvis Matebele, who spent sleepless nights studying together with me in our undergraduate years.

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ABSTRACT

Globalisation and technology change have created a new global economy fuelled by information and driven by knowledge. Information and Communication Technologies (ICT) have been touted as potential powerful tools for enabling educational change and reform. Namibia is among those countries that have adopted the use of ICTs as a vehicle for change. This thesis explores the role of school principals in promoting and managing computer usage in selected schools in Namibia. The study was conducted at four schools in the Caprivi Region. The study employed a qualitative case study to collect and analyse data. A total of four school principals and four computer coordinators were interviewed, and responded to questions pertaining to the role of principals in the following areas: acquiring ICT equipment; providing access to the computer labs; promoting the use of computers; maintaining computers; capacity-building of teachers, and addressing challenges that could prevent computer usage. Two focus group interviews were also conducted at two schools, to find out what they perceived to be the role of school principals in supporting and ensuring the effective use of computers in schools.

The findings on acquisition of computers reveal that principals were often the initiators of the acquisition process. Ministerial deployment is the most common form of acquisition, followed by the use of the school's development fund to purchase administrative computers. Only one of the participating schools did not acquire its computers through Ministerial deployment. Some schools were more resourced than others. Availability and maintenance of equipment depended on the kind of school (advantaged or disadvantaged) and the way the computers were acquired rather than on the role of the principal. Schools that acquired their computers through the ministerial deployment received satisfactory technical support from the ministry while schools that acquired their computers through other sources had to rely more heavily on the principal to pro-actively seek support. School principals that demonstrated the qualities of transformational leadership promoted the usage of computers by taking part in training offered to teachers and encouraged teachers on different platforms to make use of computers. The study also found that schools in which principals actively supported and promoted the use of computers were successful in the usage of the computer labs, while in schools where principals left the running of the computer lab to an individual

teacher, the usage was minimal. It was found that a number of challenges are hampering the usage. These include lack of internet connectivity, qualified personnel to cascade training, and minimum infrastructure.

The study recommends that school principals should adopt strategies that encourage teachers to use computers in their daily routines. It also makes suggestions for further research on the impact of school culture on ICT integration.

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LIST OF ACRONYMS USED

BECTA	**British Educational Communication and Technology Agency**
CBI	**Computer Based Instruction**
CCTs	**Computer Coordinator Teachers**
E-Mail	**Electronic Mail**
ETSIP	**Education and Training Sector and Improvement Programme**
ICDL	**International Computer Driver's Licence**
ICT	**Information and Communication Technology**
ISTE	**International Society for Technology in Education**
MBESC	**Ministry of Basic Education, Sports and Culture**
MHETEC	**Ministry of Higher Education, Training and Employment Creation**
MICTSC	**Ministry's ICT Steering Committee**
MoE	**Ministry of Education**
NETA	**Namibia Educational Technology Association**
NETSS	**National Educational Technology Service and Support Centre**
NGO	**Non-Government Organisation**
NIED	**National Institute for Educational Development**
PQA	**Programmes and Quality Assurance**
SDF	**School Development Fund**
UNAM	**University of Namibia**
UNESCO	**United Nations Educational, Scientific and Cultural Organisations**

Chapter One

Introduction to the research

1.1 Introduction

This chapter presents the context of and motivation for the research, its goals and its methodology. It concludes with an outline of the study.

1.2 Research Context

Namibia has joined the rest of the world in selecting Information and Communication Technology (ICT) as the means to help her foster a knowledge-based society. Different Ministries have undertaken several national initiatives aimed at accelerating the growth of ICT in Namibia. Recognizing the role that education can play in developing technological skills, the Namibian Ministry of Education (MoE) developed a fifteen-year Education Training Sector and Improvement Programme (ETSIP), aimed at embedding ICT in all levels of the education system, and thereby enhancing the quality of teaching and learning in schools. In order to make ICT an integral part of education, the Ministry of Education – through the National Institute for Educational Development (NIED) – developed a national Policy for ICT in Education (MoE, 2007a, p. 66; MBESC & MHETEC, 2005, p. 3), which was later revised in 2000 (MBESC & MHETEC, 2005, p. 3). In 2003 the Ministry's ICT Steering Committee (MICTSC) was constituted, to coordinate the many ICT initiatives launched in the educational sector (MoE, 2006, p. 11). The first task performed by the committee was to review and update the Policy for ICT in Education (MoE, 2007, p. 6). The policy was approved by cabinet and adopted in 2005 (MoE, 2006, p. 37).

The MICTSC developed a detailed implementation plan aimed at translating the Policy for ICT in Education into a cohesive set of interventions embedded within the Education and Training Sector Improvement Programme (ETSIP). In 2008 alone, the MoE was expected to

introduce ICT to a minimum of 200 senior secondary schools (Namibia. MoE, 2006, p. 37). This responsibility entailed providing computers, printers, scanners, televisions and videocassette recorders to schools. Any large-scale initiative requires significant investment, both financial and in terms of the human resources that are expended during policy implementation. Questions are bound to arise about the return on such investments once the implementation is underway. Principals, being the overseers of the resources available to schools, are expected to lead the integration of ICT.

On an international level, a number of studies have been carried out to explore the impact of computer technology on teaching and learning (Pelgrum & Schipper, 1993); the factors influencing the integration of computers in education (Cuban, Kirkpatrick & Peck, 2001); professional development activities for teachers (Reinen & Plomp, 1993), and the attitudes of school principals and teachers towards computers (Serhan, 2007). Pelgrum's (2001) study, investigating the obstacles that might impede the integration of ICT in schools, identified weak technical support as a major problem. Furthermore, in Malaysia, a study carried out by Bali, Wright and Foster (1997) investigating pre-service teachers' reactions to the technology available in schools, found that many prospective teachers were surprised both by the nature of the resources available, and the ability of the learners to use them.

The above paragraph suggests that the availability of equipment does not necessarily result in its effective use by learners or teachers. Anderson and Dexter (2000, p. 17) stress that although infrastructure is important, the active involvement of school leadership is more crucial if technology is to become part of the school culture. Schiller (2003) identifies the school principal as, potentially, the most effective agent for integrating technology into the pedagogical practices of teachers. Schiller (2003, p. 172) further cautions that many school initiatives fail because the school's administration does not adequately understand the policy at hand, and does not support the plans for its implementation. Wilmore and Bentz (2000) pick up on this theme, explaining that "Information and Technology will only be successfully implemented in schools if the school principal actively supports it, learns as well, provides adequate professional development and supports his/her staff in the change process" (p. 15).

Despite the growth of research into ICT in schools, few studies have examined the role of school principals in promoting the use of computers. Afshari, Abu Bakar, Luan, Abu Samah and Fooi (2008) investigated the extent to which Iranian school principals used ICT in their schools, and drew conclusions about their perceived technological competency. The study found that most of the principals primarily used computers to communicate with their staff members. In another study concerning the promotion of ICT, Mentz and Mentz (2003) investigated strategies adopted by principals in under-resourced schools to cope with increasing demands for the integration of technology into the curriculum. The study revealed that these principals were more often than not frustrated by the lack of technological infrastructure in their schools.

Although much research into the role of principals in supporting the use of computers has been conducted elsewhere, little is available about Namibia. Therefore, there is a need to investigate whether and how principals promote computer usage in Namibian schools. It is against this background that I shall now present the rationale for my study.

1.3 Research Motivation

My interest in this study emanates from my professional experiences, as a former educator and, currently, as a Resource Officer. Listening to Teacher Resource Centre managers during my involvement in the TRC Baseline data collection project in mid-2008, I discovered that some principals do not encourage their teachers to use the technologies available to them. My interest was further triggered after visiting the ETSIP website (http://www.etsip.na). The page devoted to ICT lists a number of challenges that affect its successful integration into the Namibian education system. The main challenges were identified as a lack of curriculum in Mathematics, Science and English, and unreliable access for schools to hardware, software, technical support and infrastructure. A further challenge lies in the need to motivate principals and heads of department to use ICT, and to see its value for teaching and learning (http://www.etsip.na).

As an Education Resource Officer, I am expected to give support to teachers by providing them with materials, and to guide them by providing them with training. Therefore, I was

struck by their lack of technological expertise, and set out to discover how I could contribute to promoting the use of computers in Namibian schools.

Another compelling reason for me to carry out this study was to contribute towards the limited literature surrounding the topic in Namibia. Namibia, like other developing countries, is challenged by a lack of qualified personnel to lead the promotion of ICT. I hope that my research will help in some small way to alleviate this problem.

1.4 What Is Unique About This Study?

As its influence is felt in many fields, ICT cannot properly be discussed in isolation. This is a multi-disciplinary study between, on the one hand, the field of Information and Communication Technology in Education, and on the other, the field of Education Leadership and Management. This combined study provided me with the opportunity to pursue an interesting and original topic of research.

Muller (2009) explains that "multi-disciplinary research is complicated by nature". The challenge for the researcher is to gain a sound understanding of two disciplines at the same time, and to become cognisant of the ways in which they might interact. Thus, the main contribution of my study is not to conduct groundbreaking research into either ICT Education or Educational Leadership and Management, but to understand and show the links between the two fields of study.

1.5 Research Goal

The main aim of this study was to investigate the role of principals in supporting the effective use and management of computers in schools. To achieve this goal, the research was guided by the following questions:

1. What are the principals' perceptions of their role in promoting computer usage in their schools?

2. What guides principals in their quest to promote the use of computers in their schools?
3. What are the obstacles that principals face in ensuring the effective use and management of computers in schools?
4. What intervention strategies do principals employ to encourage the use of computers at school?
5. How do teachers perceive the role of school principals in supporting computer usage in schools?

1.6 Research methodology

This study is located within the interpretive paradigm. Cohen, Manion and Morrison (2000, p. 36), assert that "the aim of interpretive research is to provide a rich description of the phenomenon and, if possible, to develop some explanation for it." I conducted a multiple case study that allowed me to gain an in-depth understanding of how principals perceive their role in promoting computer usage in their schools. I chose to employ a case study because I felt that it would provide me with a holistic, intensive description and analysis of the issue at hand (Merriam, 2009, p. 203).

My study was carried out at four schools, three of which are located in an urban area and one in a rural area. Four school principals, four computer coordinator teachers**,** six educators and one MoE official who serves as a member of the MICTSC were involved in the study. The participants were purposively selected. Four criteria's, all geared toward allowing the researcher an in-depth understanding of the phenomenon, were used in selecting schools and participants. Firstly, participating schools should have had their computer laboratory for at least one year. Secondly, in exception of school principals, participating teachers should have at least be using computers for teaching or for other purposes (see 3.2.3 for the other two criterions).

Permission was first sought through the Regional Director and the principals of the four schools. Participants were informed of the purpose of the research and of their right to

withdraw if they felt uncomfortable. Confidentiality and anonymity were granted by the use of pseudonyms for schools and all participants.

Three methods of data collection were employed. Semi-structured interviews served as the primary tool for collecting data. Four school principals, four computer coordinator teachers and one MoE official were interviewed to gain an in-depth understanding of the issue. Two focus group discussions, each comprising three participants, were held at two schools. The participants were teachers who were using, or at least had interest in using, computers. These interviews were recorded using a voice recorder and then carefully transcribed. Official Ministerial documents, documents developed by the schools in question, and documents generated by the researcher were analysed. Data from all sources were triangulated to determine any similarities or contradictions.

1.7 Limitations

The number of people I was able to interview for this study was limited to school principals, computer coordinator teachers and selected educators from four schools. This is not nearly enough to constitute a comprehensive survey of the issue of computer usage in Namibian schools. However, the use of methodological techniques that provided the data with credibility, transferability, dependability and conformability, enhanced the trustworthiness of the study. These four features allowed me to develop a theoretical basis for applying the results of my research to other cases of a similar context.

1.8 Operational definitions

The following concepts are apposite to this study.

Adoption of computers: Means the process by which computers are accepted and implemented within the school.

Computer competence level: Refers to the skills and knowledge of using computers, acquired through training or self-teaching.

Diffusion: Is the process by which an innovation is communicated through certain channels over time among the members of a social system (Rogers, 1995).

Information and Communication Technology: ICT includes hardware, processes, and systems that are used for storing, managing, communicating and sharing information (Namibia. MoE, 2005, p. 4).

ICT integration: Is the incorporation of technological resources and technology-based practices into the daily routines, work, and management of organisations such as schools.

Leadership: The reciprocal process of mobilizing, by persons with certain motives and values, various economic, political and other resources, in the context of competition and conflict, in order to realise goals independently or mutually held by both leaders and followers (Burns, cited in Marturano & Gosling, 2007, p. 95).

1.9 Thesis Outline

Chapter One introduces the context of and motivation for the research, details its goal and its methodology, acknowledges its limitations, and provides operational definitions for terms that will be used throughout the thesis.

Chapter Two provides a review of the literature surrounding the role of principals in promoting computer usage in schools. It reviews managerial functions and leadership roles performed by principals toward this end. It also reviews leadership theories that serve to promote the integration of ICT in schools.

Chapter Three describes the methodology employed while conducting the research. The chapter provides a detailed description of the procedures I followed while collecting the data, an analysis of the data I collected, and an argument for its validity.

Chapter Four presents my research findings from the four schools I investigated.

Chapter Five presents a discussion of the research findings, and shows how they relate to the research questions.

Chapter Six offers an overall conclusion to the research findings, and recommendations for future practice and future research.

Chapter Two

Literature review

2.1 Introduction

Over the past twenty years, the perception that ICT may accelerate economic development and improve the lives of individuals has seen governments seek to increase the diffusion of ICT into schools and to restructure teaching and learning environments (Brockmeier, Sermon & Hope, 2005). Namibia is among those countries that have invested heavily in installing computers in schools. However, many foreign institutions and governments have found that ICT has failed to meet their high expectations. In the Netherlands, for example, Leydesdorff and Wijsman (2008) recently published an article entitled "Why Government ICT Projects Run Into Problems." One significant contribution to the failure of ICT initiatives, as demonstrated by several international studies, is a lack of leadership (National Centre for Educational Statistics, 2000). Several studies have found that school principals play an increasing role in leading change, by providing vision and objectives, supervision and support for their staff (Schiller, 1991; Wilmore & Betz, 2000).

This chapter attempts to discuss the role of principals in the adoption of ICT in schools, by reviewing the work of several academics and researchers. There are several reasons why school principals are expected to know, utilise and lead activities relating to technology. These reasons are (1) to prepare learners to take on active roles in a knowledge-based society, (2) to train students to perform a particular job, and (3) to improve teaching and learning (Valdenz, 2004). To give an overview of the kind of leadership role that principals are required to perform, I begin by conceptualising technology leadership in Section 2.2. That will be followed by a discussion on pros and cons of computers (Section 2.3), and then the difference between leadership and management (Section 2.4), and I conclude the chapter by discussing three theories of leadership (transformational, instructional and teacher leadership) that provide the theoretical rubric for this study.

2.2 Conceptualisation of Educational Technology Leadership

Scholars and practitioners, contributing to the field over the past four decades, have attempted and failed to give a concrete definition of the concept of educational technology leadership. Luppicini (2005) ascribes the controversy surrounding the meaning of the concept to the multiple knowledge bases employed in social sciences, and the resultant difficulty of establishing the field's credibility. Pearson and Young (2002) also note that "many people, even those within the educational system, confuse educational technology with technology education".

Explaining the confusion surrounding educational technology, Ely (1972) recommends that "to arrive at its definition, the field first needs to gain credibility with professional educators, so that it may survive as a legitimate field of research and develop on its own terms". Ely claims that establishing an intellectual territory for the concept would accomplish this goal.

Since Ely's invitation, several writers have wrestled with the concept. Luppicini (2005) observes that it is necessary when defining educational technology to distinguish between social scientists' and engineers' understanding of the concept. In his attempt to draw this distinction, Luppicini (2005) describes technology from the engineering perspective as "a process of material construction based on systematic knowledge of how to design artefacts". In contrast, social scientists view technology in broader terms, expanding on what is understood of material construction to include its social significance as well. Of the two, the social scientist view of technology is more applicable to the current study.

In Namibia, The Namibian Education Technology Alliance (NETA) has recently published an ICT integration manual for schools in Namibia, aimed at guiding principals and teachers in their efforts to incorporate ICT into the teaching and learning practices of the school. However, the document is silent on the concept of technology leadership. Ho (n.d.) has also attempted to conceptualise the concept, likening it to educational leadership. However, as the literature reveals, although leadership is among the most extensively researched phenomena in education, there remains no universally-accepted definition of its role and function in schools (Everard, Morris and Wilson, 2004, p. 3). Rost (cited in Marturana & Gosling; 2007)

attributes the lack of a globally recognised definition of leadership to the fact that it has been studied in many different ways by many different disciplines.

As the literature reveals, there are many conceptualisations of leadership. These include trait theory, behaviour theory, situational theory, transactional theory and newer, emerging theories. However, as contended by Kearsley and Lynch (1994), “the leadership role envisaged for principals in the integration of technology into schools is different from other forms of leadership”. While other forms of leadership are more concerned with change, technology leadership focuses on innovations, and as such it requires exceptional attention. In this study emphasis is placed not on teaching learners about technology, but on the use of technology to help students enhance their learning of whatever subject they may be studying. Kearsley and Lynch (1994, p. 6) and Anderson and Dexter (2000), posit that technology leadership is about setting procedures and policies, and creating ideal situations within a given organisation. Therefore, for a principal to fulfil the role of a technology leader, he or she is expected to establish an ICT vision for their school, and give support to teachers as they attempt to realise this vision.

Therefore, it appears as though an effective technology leader, in the context of education, should be a public advocate of the mission-driven use of technology, be able to maximise relationships with various groups both within and outside of the school, and be able to inspire others to invest time and energy into planning for and making use of technology. I shall now discuss the importance of good technology leadership.

2.3 Pros and Cons of Computers

This section is aimed at discussing the elements that are usually involved in successful ICT integration, as well as examining the benefits and challenges of incorporating ICT into schools. I begin the section by looking at the benefits of computer usage in schools, and argue that these benefits arise as a result of good leadership practices. A discussion of the challenges of ICT integration, which in my view are caused by poor leadership, will follow.

2.3.1 Benefits of Computers in Schools

Research has highlighted both the benefits and problems associated with the use of computers in schools. Kearsley and Lynch (1994) stress that “the use of computers in well-managed schools both improves the academic achievement of learners, and increases attendance at school”. Furthermore, the use of "computers reduces teacher and learner burnout, and results in fewer turnovers of staff”. These benefits are echoed by several scholars (Rusten, n.d; Ravaglia, 1995; Bitter & Pierson, 2002, p. 103). Rusten (n.d) notes that “computers possess the potential to enhance learning and teaching”. He argues that, “unlike other educational technologies, computers give the individual a unique and interactive learning experience”. Thus, the benefits of having computers in the classroom fit well with the concept of Learner Centred Education (LCE), upon which the Namibian Education System is grounded. Applying the use of computers to LCE requires that school leaders learn programs, set ICT policies, and teach in such a way that supports effective computer-based learning.

Furthermore, Rusten (n.d), Ravaglia (1995), and Bitter and Pierson (2002, p. 103) claim that computers can make learning individualised and interactive. In addition, computers may lead students to discover patterns of information, through experimenting with new forms of expression and pursuing questions and ideas that stem from their new educational experiences. Pieters (2001) postulates that “the use of computers allows teachers to plan a variety of learning experiences, and hence also allows students to accomplish their performance tasks in a variety of ways”. In the case of Namibian schools, teachers could use computers when planning their lessons to aid them in incorporating the unique differences between learners – their individual abilities, talents, emotional states of mind, learning rates, learning styles and stages of development – into their learning experiences. All of these characteristics must be considered if all learners are to learn more effectively.

Ravaglia (1995) agrees with this assertion, stating that “the use of computers is beneficial to teachers, as they are able to adjust the level of instruction to match the particular learner’s needs”. Instead of merely gearing most activities towards the average learner, teachers can challenge gifted learners and provide remedial instruction for those who require it. As noted by Bitter and Pierson (2002, p. 103), “a computer is a patient teacher that allows learners to determine their own pace, thus freeing the teacher to work with learners on a one-to-one

basis". However, it must also be noted that such a classroom scenario depends on teachers and students possessing technological knowledge and computer skills.

Contributing to the narrow field of literature on ICT in Education in Namibia, Matengu (2003, p. 64) notes that "computers can be used as an efficient way of managing data". Computers are excellent data managers and they can make it easier for teachers and principals to maintain accurate records, an invaluable feature of good school and classroom management. In the Namibian context, spreadsheet programs such as Microsoft Excel and OpenOffice Calc can be used to record test scores, and database managers such as Microsoft Access and OpenOffice Base can be used to record student information, such as their grade, the names of their guardians, and other pertinent information. In addition, computers also increase the accuracy and reduce the time and costs involved in data capturing, and make it possible to quickly retrieve and analyse information for decision-making purposes. Furthermore, computers make it possible for teachers to maintain accurate student records, track and analyse learners' performances, and use the resulting information to make decisions about how to individualise their instruction. This in turn reduces teacher burnout, as they are able to work more efficiently.

A study carried out in the United Kingdom by Pricewaterhouse Coopers in 2004 found that ICT helped to address workload issues, especially amongst those teachers who used computers confidently. Most of the teachers perceived the benefits of computers as being their ability to manage, store and maintain information, as well as their usefulness with regard to other work such as writing reports. However, other teachers felt that it took longer to complete some of their administrative tasks when using computers. The study found that the positive impact of ICT on workload was hindered by a lack of confidence and skills on the part of staff, a lack of policy to explicitly address workload issues, and ineffective networks. It identified good leadership, appropriate training, sound technical support and effective networks – including reliable Internet connectivity – as factors that contributed to the lessening of workload following ICT integration.

2.3.2 Challenges of Computers

It is therefore evident that computers offer significant benefits to the classroom. Computers, as explained above, support teachers' role as facilitators, allowing them more time to individualise their teaching strategies. This is perfectly in line with Namibia's Learner Centred Approach to education. However, the success of computer usage in schools depends on the type of leadership practised by those in leadership positions (in this case, principals and teachers). Factors such as a lack of technical support, a lack of computer skills among staff members, the unavailability of infrastructure, and subversive attitudes on the part of teachers and principals can also inhibit the integration of ICT into teaching and learning. The Office for Standards in Education (OFSTED) concluded in 2004 that "good leadership is a critical factor in the promotion of technological know-how", and recommended that courses on strategic leadership in ICT be made available to middle management and those working to support schools in implementing new ICT policies.

As a result of poor technology leadership Kearsley and Lynch (1994, p. 11) identify the following setbacks linked to technology use in education:

- lack of knowledge about how to use technology;
- lack of adequate time or funds to properly implement technology;
- use of technology for its own sake rather than genuine need;
- unequal access creating "have" and "have not" groups;
- poorly designed facilities resulting in negative attitudes about technology; and
- over-resistance on the part of the potential user.

Gips, DiMattia and Gips (2004) have also contributed to the discussion surrounding the disadvantages of having computers in schools. Although Gips et al. do not explicitly make the connection, I believe that poor technology leadership may account for the disadvantages that they identify. One of the disadvantages listed by Gips et al. is an increase in educational costs. As suggested by Kearsley and Lynch (1994, p. 10), "a lack of knowledge about the use of technology can result in increased costs, often with the concomitant perception that the technology does not work". Hankason and Hooper (2000) have also hinted that "ICT

initiatives channel limited resources to pay for computers and upgrades to software and memory, and hence that other educational needs become sacrificed".

Kearsley and Lynch (1994, p. 12), and Tiene (cited by Criss, 2006) identify the issue of the unavailability of computers to all learners as another challenge. They argue that not all students will have access to a computer, which will result in the teacher either rescheduling the activity or rotating students – both of which being time-consuming measures. As noted by Kearsley and Lynch, "if not properly managed, the acquisition of too few computers can create a situation where there is unequal access to them". For example, a school could allow only learners doing accounting, computer science or mathematics in specific grades to use computers, while the rest of the student body would be forced to learn without them.

Furthermore, poor technology leadership can result in serious health risks and other social problems. For example, it is widely reported that visual ailments and back problems can result from prolonged computer usage. However, technology can also be seen to provide us with ways of overcoming these risks, like in the case of Workrave software. Once installed, Workrave can be set to disengage the screen every fifteen or twenty minutes. The software periodically locks the computer while an animated character called 'Miss Workrave' guides the user through various stretching exercises (Bacon, 2004).

Moreover, as observed by UNESCO (2002, p. 43) and the British Educational Communication and Technology Agency (Becta) (2005a, p. 5), the power to access information brings about increased responsibilities. Issues such as legal and moral codes need to be considered and respected when information is made freely accessible by communication technology. Copyright infringement of electronic documents and software is one of the most serious challenges presented by the presence of technology

Becta (2005a, p. 5) identifies addiction to the Internet, computers or other related technology as having a negative effect on learners' academic performances. Furthermore, learners who use the Internet unsupervised may be exposed to pornographic or hateful material. A study carried out by the Kaiser Family Foundation (2001), investigating how young people used the Internet for health information, found that most of the participants were worried about pornography on the Internet and believed that it was harmful. Seven out of ten of the participants had stumbled across pornographic material while browsing the Internet.

These are some of the possible drawbacks to computer usage in schools. In the next section, I explain the elements that contribute towards a successful implementation of ICT in the context of education.

2.3.3 Elements of Successful ICT Implementation

The purpose of this section is to provide a perspective on the elements that contribute towards a successful integration of ICT in schools. Despite many challenges hindering the effective use of computers in schools, there are numerous examples of successful ICT integration that one can draw lessons from. Flanagan and Jacobsen in their 2003 article, 'Technology leadership for the Twenty-First Century', list five key elements for ensuring a successful ICT integration. These elements are student engagement, shared vision, equity of access, professional development, and ubiquitous networks. A brief description of each of the elements follows.

Student engagement: As indicated in the previous section, Learner Centred Education – upon which the Namibian Education System is premised – recognizes that learners have unique and individual abilities, talents, emotional states of mind, learning rates, learning styles and stages of development. The use of ICT, as I have already explained, allows teachers to customise their lessons so that they can attend to the individual student's specific needs. This enhancement of student engagement is a crucial step toward effective computer-based learning.

Shared vision: In schools that are managed by effective leaders, a common vision – which clearly defines the role of technological integration – is established before the integration takes place. As Reidl, Smith, Ware, Wark and Young (1998, p. 3) write, "A vision of the role of technology in learning must be developed that it can give direction to decisions about the purchase, deployment, support, and use of the technology".

Equity of access: Schools that use ICT effectively provide access to computers to all learners and teachers. The literature surrounding this topic reveals that if technology is to be effectively used, all students should be given equal access to it, notwithstanding their level of

computer skills, the subjects they are studying, and their gender (Becta, 2007, p. 16; Newhouse, 2002, p. 44).

Professional development: In schools that have reported the successful integration of ICT, research shows that this has been achieved through schools extending the capacities of their staff members. As Sergiovanni points out:

> Teachers count in helping schools to be effective. Building capacity among teachers and focusing that capacity on students and their learning is the crucial factor. Continuous capacity building … is best done within communities of practice. (2000, p. 140)

Ubiquitous networks: As noted by Flanagan and Jacobsen (2003), schools that have successfully integrated ICT work towards the establishment of ubiquitous networks. Networked computers allow for the constant sharing of information, and facilitate collaboration. In addition, networked computers ensure that tools for presentations, data analysis, concept mapping and communicating with others are available whenever they are needed.

Reidl et al. (1998) add two more elements – Time and Assessment – to Flanagan and Jacobsen's list. They emphasize that teachers should be given ample time to practise the computer skills that they learn in workshops. Also, Franklin (2007) stresses that "teachers need to be released from their classroom duties in order to learn, practise and plan ways to integrate technology into their curriculums". Furthermore, there should be time set aside in the daily schedules of students for them to use technology. The final element, Assessment, calls for schools to reflect the presence of ICT in their evaluations of learner outcomes. In the next section, I shall discuss factors that can inhibit the integration of ICT in schools.

2.3.4 Constraints and Barriers to Computer Integration in Schools

The preceding sections dealt with the benefits and disadvantages of computer usage in schools. However, several studies have identified many barriers affecting the actual process of ICT integration (Pelgrum, 2001; Ertmer, 2001; Pelgrum & Law, 2003; Becta, 2004). All of these studies identified several factors which affect the integration of ICT in schools, namely:

the attitudes of teachers toward innovations; the role of the school's ICT coordinator; the attitudes of senior administrators, and the amount and quality of ICT support and training available to schools. In his review of several articles dealing with the challenges posed by the integration of ICT in schools, Earle (2002) identified seven important considerations:

- access to hardware and software as well as funding;
- time for planning and personal exploration;
- online access and skill development;
- technical and administrative support
- the provision of resources, training and expertise;
- resistance and support within the school culture and traditions of teaching; and
- the role of vision and leadership in incorporating technology into the curriculum.

These findings were recently echoed by studies conducted by the European Schoolnet (2006) and Becta (2004a), both of which were investigating barriers affecting ICT use in schools. The European Schoolnet report divides the barriers into three categories, namely: (1) teacher level barriers, (2) school level barriers, and (3) system level barriers (2006, p. 50). The first barrier includes a lack of ICT skills on the part of teachers, their lack of motivation and confidence in using ICT, and inadequate teacher training. The school level barrier involves the absence or poor quality of ICT at some schools, limited access to ICT equipment, a lack of experience in project-based learning, and a lack of concern for ICT in school policy strategies. Lastly, the system level barrier refers to the rigid structure of the traditional schooling system. An elementary school study done in Turkey by Yalin et al. in 2007 investigating problems faced by teachers in incorporating ICT into their teaching practices found that the main challenges they faced were: (1) a lack of training, (2) a lack of hardware, (3) a lack of time to develop teaching materials, and (4) a lack of technical support.

In her study, Ertmer (2001) groups the barriers into two different categories: (a) aspects that are out of teachers' control, and (b) aspects that are related to teachers themselves. Things that teachers have no control over include access to technology and resources, implementation time, technical support and content training. However, Ertmer argues that

even if these barriers were removed, the teacher wouldn't necessarily begin to use ICT. She calls for the addressing of the second group of barriers, those that the teachers can exert control over. These include their attitudes, beliefs and implementation strategies, their endurance and their commitment to the integration process. In agreement with this claim, Yalin et al. (2007) also highlight the notion that "teachers' beliefs determine their planning style and implementation strategies".

Responding to a study conducted by Mentz and Mentz in 2003 on the management of technology in South African schools, principals identified the following obstacles: (1) insufficient material support; (2) untrained teachers; (3) the socio-economic status of the community; (3) insufficient security and resultant vandalism and theft; (4) curriculum constraints; and (5) a lack of classrooms suitable to serve as computer labs. In the area of school improvement, Harris (2002, p. 19) has also identified the following factors that inhibit school improvement:

1. Unclear purposes and goals: if the reasons for the change are not transparent it is unlikely that teachers will be committed to working towards the change.
2. Competing priorities: when there are many changes taking place simultaneously then the constraint of time will mean that some changes are given more priority than others.
3. Lack of support: in order to implement change the needs to be adequate technical, professional and emotional support for teachers.
4. Insufficient attention to implementation: many school improvement efforts fail simply because insufficient thought has been given to exactly how change is to be embedded within schools and classrooms.
5. Inadequate leadership: any successful change or innovation will require direction and leadership. Where school improvement fails it is often because it has lacked leadership within the school or has been delegated to others without authority to take it forward.

Thus, the literature reviewed in this chapter (Pelgrum, 2001; Ertmer, 2001; Pelgrum and Law, 2003; Earle, 2002; European Schoolnet, 2006; and Yalin et al., 2007) suggests that there are a

number of factors that can affect the implementation of computer-based learning in schools. If technology integration is to be successful, these barriers must be overcome.

In summary, in this section I suggested that, with proper leadership and management, computers can improve academic performance by offering an individualised learning experience to students, and by minimising burnout amongst staff. However, the literature review I presented also strongly cautioned that, with poor leadership, the presence of computers in schools could lead to serious problems. I concluded this section by delineating a number of barriers that might impede the successful integration of ICT in schools.

2.4 The Difference Between Leadership and Management

As alluded to in Chapter One, the aim of this study is to investigate the role of principals in promoting and managing the usage of computers in four secondary schools. As observed by Law, Pelgrum & Plomp (2008, p. 104), when ICT is introduced to a school, a number of organisational and management issues must be considered, solutions to potential problems found, and appropriate actions taken. These organisational issues fall into two categories, those dealing with management and those dealing with leadership.

However, there is a common understanding among researchers that leadership and management are intertwined (Pont, Nusche & Moorman, 2008, p. 18). This means that one could perform leadership and management duties simultaneously. Dimmock (1999) provides a distinction between school leadership, management and administration, but still recognises that the responsibilities of the principal encompass all three. Van Deventer and Kruger (2003, p. 68) note that "effective principals are both managers and instructional leaders, as such recognizing that both roles are indispensable and providing a balance between the two is vital". Nangolo Mbumba, the Minister of Education in Namibia, also perceives the school principal as both a manager and leader:

> In order to fulfil his responsibilities the principal must be an inspiring professional leader and manager at his or her school. The principal has to establish and maintain procedures for efficient administration and provide effective leadership to teachers and staff in order to implement the curriculum, including the promotion of links with the community the school

serves (Namibia.MoE *Guidelines for School Principals*, 2005).

While trying to differentiate the two concepts, Van Deventer and Kruger (2003, p. 68) note that leadership relates to mission, direction and inspiration, while management involves designing and carrying out plans, getting things done and working effectively with people. Cuban (cited by the National School of Leadership) writes:

> By leadership I mean influencing others' actions in achieving desirable ends. Leaders are people who shape the goals, motivations, actions of others. Frequently they initiate change to reach existing and new goals. Leadership …takes…much ingenuity, energy and skill. (2005, p. 5)

> Managing is maintaining efficiently and effectively current organisational arrangements. While managing well often exhibits leadership skills, the overall function is toward maintenance rather than change. I present both managing and leading and attach no special value to either since different settings and times call for varied responses. (2005, p. 5)

As can be observed from the above definitions, leadership is about influencing others within a given organisation to achieve a certain goal, while management is about maintaining the organisational resources efficiently and effectively. In the context of ICT, the principal is expected to lead the school in developing a shared vision, which will provide direction on how to integrate technology. Their (concomitant) managerial responsibilities will include ensuring that computers are used toward the realisation of this vision.

Bush (2003, p. 8) links leadership to values or purpose, and argues that management relates to implementation and technical issues. On the same note, Everard, Morris and Wilson, (2004, p. 3) indicate that management in its broadest sense is about:

1. setting directions,
2. planning how progress will be made or directed,
3. organising available resources (people, time, materials) so that the goal can be economically achieved in the planned way,
4. controlling the process (measuring achievement against plan and taking corrective correction where appropriate), and

5. setting and improving organisational standards.

The above paragraphs have demonstrated that both leadership and management need to be regarded with equal importance if schools are to operate successfully. While a clear vision is essential in establishing the nature and direction of change, it is just as important to ensure that innovations are implemented economically. Hence my research considers that the successful integration of ICT in schools requires that school leaders display effective leadership, management and administration.

The Namibian MoE *Guidelines for School Principals* (2005) posits that:

> they are numerous duties and responsibilities undertaken by principals, depending on the type of school they are in charge of, its approaches and its specific needs. Principals are expected to lead their school, attend to discipline issues, manage the budget, and respond to official tasks given to them by the Regional Directorate. They are accountable for all government resources at the school, and for creating a positive climate and an effective learning environment.

Furthermore, they are responsible for leading and managing all staff members. Given all of these responsibilities, it is unsurprising that Ornstein and Hunkins (2004, p. 304) comment that, "the principal is a key guarantor of successful innovation and implementation".

There are a number of research findings that give insight into the role of principals in integrating technology into their schools. Inkster (cited by Kozloski, 2006) reports that "the responsibilities of a 21st-Century principal with regard to technology management should include coping with change, staff development, leadership, planning, safety and security, infrastructure, ethics, curriculum and technological support". Hsiao, Chen and Yang (2007) investigated the leadership role of high school principals in Taiwan. Their study classified the role of the principal in curriculum reform as belonging to three phases: duties performed during the design stage, duties performed during the implementation stage, and finally, evaluation and monitoring of the reform once it has been implemented.

In research conducted in seventeen elementary schools in Turkey, Akbaba (2004) found that there were differences in how the Ministry officials, principals and computer teachers viewed the role of principals in managing ICT integration. The Ministry officials expected principals to fulfil the duties of leadership, supervision, communication, planning, coordination, public

relations, and ethics. When interviewed, computer teachers said that they looked to principals to provide leadership, communication, planning, coordination, supervision empowerment, and security. However, the principals themselves perceived their role to be facilitators, communicators and capacity builders.

Nevertheless, the degree to which school principals are expected to fulfil all these responsibilities remains unclear. Brockmeier et al. (2005, p. 46) link the uncertainty as to what duties principals are expected to perform in leading technology to too few studies on the subject, as the majority of studies have been focused on teachers and the instructional environment.

The International Society for Technology in Education (2006, pp. 6-7) suggest the following responsibilities for school administrators:

- Inspire a shared vision for comprehensive integration of technology and foster an environment and culture conducive to the realization of that vision.
- Ensure that curricular design, instructional strategies, and learning environments integrate appropriate technologies to maximize learning and teaching. Apply technology to enhance their professional practice and to increase their own productivity and that of others.
- Ensure the integration of technology to support productive systems for learning and administration.
- Use technology to plan and implement comprehensive systems of effective assessment and evaluation.
- Understand the social, legal, and ethical issues related to technology and model responsible decision-making related to these issues.

To summarise, the literature I reviewed suggests that school principals, as appointed Ministry employees, are overseers of their school's resources, and hence are expected to perform various roles in supporting teachers in using computers. These duties include leadership, supervision (monitoring), communication, staff development, coordination, public relations, empowerment, facilitation, ethics, and security.

I shall now discuss in more detail the management and leadership roles of school principals in ICT integration.

2.4.1 Management of ICT Equipment

The school principal's role in ICT integration is broad and dependent on many factors. How the school implements and makes use of ICT for teaching and learning depends on a number of factors, such as the school's ICT policy, its resources and security, and the management of its resources. Careful management and control of ICT resources is one of the most important roles of the school principal. According to the MoE's *Guidelines for School Principals* (2005, p. 172), the principal of a state school is responsible and accountable for all equipment, materials and supplies in his or her school. Kruger (2002, p. 167) also identifies the principal as the major player in ensuring correct and careful management of school stock. However, both the MoE and Kruger concur that the involvement of other staff members in the management of these resources is necessary to ensure their efficient and effective use.

Although research is unclear on how principals should manage ICT integration, findings from studies concerning the management of buildings and other school equipment provide a number of suggestions as to what should be expected from principals. Davidoff and Lazurus (cited in Kruger, 2002, p. 167; MoE *Guidelines for School Principals*, 2005, pp. 173-186) suggest the following strategies for the management of resources in a school:

- Identifying the needs for the resources;
- Obtaining the resources;
- Creating an effective stock-taking system;
- Securing the resources;
- Distributing resources effectively and fairly; and
- Maintaining resources.

The literature I reviewed suggests that school principals play a significant role in acquiring ICT equipment. In consultation with other staff members, the principal identifies the needs of

the school. They are then responsible for devising a strategy on how to acquire the identified needs.

Buchel (1992, p. 175) mentions three ways in which the school can acquire its stock. These are: (i) provided by the department on an allocation basis, (ii) purchased with money from the school fund, or by learners themselves, or with money made available by the governing body and other bodies involved in the running of the school, and (iii) through donation. Buchel's views are similar to the findings of Prince's 2007 case study conducted in the Makana district of South Africa's Eastern Cape. Prince found that schools acquired their computers from seven different sources, namely: donations, school funds, fundraising, loan, higher purchase lease, social responsibility projects and competitions involving pupils. Of the seven, donations and the use of school funds were found to be the most common modes of acquisition.

However, the effective management of resources goes beyond their mere acquisition. Purchased equipment needs to be properly received and stored. According to Kruger (2002, p. 169) and MoE *Guidelines for School Principals* (2005, p. 176), the principal or a designated member of staff should receive the consignment and verify that the package is not damaged, and that there are no missing items. If anything is amiss with the consignment, the supplier needs to be contacted immediately.

As observed by Becta (2004b), although ICT is a powerful educational resource, its introduction poses a lot of challenges. For example, schools have reported several cases of burglary. In the United Kingdom, Becta (2004b) reports an increase in theft of projectors and computers. However, several researchers have endeavoured to provide solutions to these security threats. Bialobrzeska and Cohen (2005, pp. 89-90) categorise ICT security issues as those dealing with physical security (such as burglary and theft), and those dealing with system security (such as protection against viruses and hackers). Bialobrzeska and Cohen suggest the installation of sound security measures, such as reinforced doors and burglar bars on windows in computer labs, to minimise physical threat.

However, provision of security measures alone does not translate into effective maintenance of ICT equipment. ICT equipment requires thorough maintenance, such as cleaning, which can prolong the lifespan of what are valuable and expensive machines. One way in which

institutions can ensure that their assets are effectively maintained, as suggested by Kruger (2002, p. 172), is by developing a maintenance policy. The literature surrounding this topic identifies four types of maintenance. They are preventative maintenance, periodic maintenance, recurring maintenance and emergency maintenance. As indicated earlier, the role of the principal differs from school to school, depending on a number of issues. For example, is there a teacher who can competently run the computer lab? In schools where there are competent computer teachers, the school principal's role will be that of supporting the teacher in cleaning or buying the necessary equipment. In preventative maintenance, services are carried out by a member of the school, normally the computer coordinator, in order to prolong the lifespan and ensure the efficient running of the machines. This includes lubricating, cleaning, adjusting and replacing minor parts so that they do not contribute to larger problems (http://www.buzzle.com). Kruger (1992, p. 172) says that such measures "[maximise] the use of equipment". However, services such as lubricating, adjusting and replacing minor parts require a knowledgeable person to undertake them, as any error in maintenance can lead to serious damage of the machines. Furthermore, as pointed out by Zin (1997), overworking the computer coordinator teacher can lead to them withdrawing from the computer laboratory.

Another form of maintenance is periodic maintenance, which Kruger defines as planned or scheduled maintenance carried out on specific days. For example, the technology teacher can schedule to clean computer hardware or run anti-virus software on a certain day. The third kind of maintenance is recurring maintenance, which is the day-to-day fixing of computers. Emergency maintenance services are performed on an irregular basis, to repair equipment that has stopped working. At schools where ICT service is delegated to a specific teacher, the principal's role will be that of supporting that teacher in fixing problems. This support will involve ensuring that the teacher has access to funds to buy replacement materials, or helping them find a technician to solve major problems. In addition, the school principal is expected to supervise and monitor the upkeep of the school's ICT equipment.

Recognising how frustrating it could be for schools to have no technical support, the Ministry of Education in Namibia established the National Education Technology Service and Support Centre (NETSS), to coordinate access to technology for all Namibian education institutions by overseeing the sourcing, refurbishment, installation, and support of ICT in schools

(Namibia. MoE, 2007, p. 53). This includes providing maintenance and technical support to educational institutions via a national helpdesk staffed by the NETSS support team. To reduce the costs of the support model, training is provided when ICT equipment is installed. This training would enable schools to carry out routine maintenance and repairs, undertake basic troubleshooting, utilise online support mechanisms to resolve problems, and liase with 2nd and 3rd-line maintenance and technical support through the central helpdesk or through the regional support channels available to them (Namibia. MoE. 2006, p. 54).

It is clear from the above paragraphs that the management of ICT resources is one of the key roles of the school principal. ICT equipment should benefit learners, and so how the principal manages it can influence the school's organisational culture. Thus, technology leadership goes beyond managing the everyday logistics of computer equipment, and involves larger issues pertaining to transformation within schools.

2.4.2 The Role of School Principals in Monitoring ICT Activities

Monitoring, or supervision, is seen as an important component of the school principal's duty. The aim of supervising teachers is to assist them in optimising their performance, and thus allow the principal to monitor the success of teaching exercises. Wagner (2003) used the term supervision to describe monitoring that is recurrent and aimed at improving learning and teaching. For Chang et al. (2008), managing and monitoring of ICT-related resources and activities are also essential functions of the principal.

To determine whether technology is being effectively employed, data related to the goals and objectives of the school's technology plan should be collected. Gosmire and Grandy (2007) identify methods of measuring the success of any technology plan. They claim that evaluation and assessment can be used to provide ongoing and intermittent feedback, which in turn can be used to inform the implementation of the school's technology plan. Gosmire and Grandy further suggest the principal, as the manager of the school's ICT resources, be at the centre of this data collection.

Furthermore, as identified by Berlin et al. (cited in Ornstein and Hunkins under c.f.2.3.4), one of the top-10 curriculum functions that school principals, as curriculum leaders, are expected to fulfil is spending time visiting teachers in the classroom. This view is supported by the Namibian MoE (2005a, p. 25), which notes that:

> The school principal should be highly visible in his or her school, and not be locked in behind a closed office door. During the school day the principal should know what is going on in and around the school, by frequently walking through the school and doing regular class visits to monitor the standard of teaching and learning.

Van der Westhuizen (1991, p. 267) also identifies class visits as one of the most important tools of evaluation in schools. He claims that two basic presuppositions underlie the gathering of information during class visits. Firstly, that the evaluator should be equipped to carry out the task and secondly, that a measuring instrument should be available to evaluate their findings both qualitatively and quantitatively. The first of these presuppositions highlights the importance of ICT training, in that the person conducting the classroom observation must be properly qualified to judge the performances of the respective teachers.

I have established from the above literature review that the leadership and management roles of school principals, in the context of ICT integration, are varied and complex. I have also suggested that school leaders implement ICT effectively when they establish a clear vision of the role of technology in their school, monitor its use, maintain its machinery and encourage new ways of teaching and learning.

2.5 Leadership Theories

The importance of technology leadership has been emphasised throughout the preceding sections. A supportive technology leader takes the staff's needs and desires into consideration when they are developing the school's ICT policy. Furthermore, they must correctly manage the school's technological resources, and show commitment to the professional development of their staff.

This section of my literature review provides an overview of the leadership theories that form the theoretical framework of this study. I shall discuss the concepts of transformational leadership, instructional leadership, and teacher leadership.

2.5.1 Transformational leadership

Jackson (2000) and Harris and Bennett (2001) have demonstrated the importance of leadership in realising sustainable school improvement. Furthermore, Harris (2003, p. 70) identifies the leadership theory known as transformational leadership as having the greatest potential for catalysing school improvement. With regard to ICT, Lawson and Comber (cited in Brundrett & Terrell, 2004, p. 145) note that "ICT has the potential to be a transformative technology". Hawkridge et al. (1999) seem to agree with this assertion, presenting a useful analysis of the purpose behind the introduction of computers into the education systems of developing countries, and concluding that the introduction of ICT is ultimately aimed at bringing about change.

The importance of transformational leadership with regard to the integration of ICT is highlighted in a study conducted by Jung, Chow and Wu (2003), who investigated the role of transformational leadership in enhancing organisational innovation. Their findings show a direct link between the style of leadership that has been labelled transformational and successful innovation within an organisation. Sosik, Kahai, and Avolio (1997) examined the relationship more directly and also found positive results. Their study, employing a computer-mediated brainstorming exercise, found that transformational leadership increased followers' creativity.

Research identifies several qualities or characteristics of transformational leaders. Firstly, transformational leaders recognize the roles played by students, teachers, parents and community stakeholders in making schools meaningful. Podsakoff, MacKenzie, Moorman, and Fetter (1990) stress that "a transformational leader deploys six strategies that helps them to shape work contexts and contribute to organisational innovation". These are: articulating a vision for the future, providing an appropriate role model, fostering the attainment of goals, setting high performance expectations, providing individual support, and providing

intellectual stimulation. Leithwood (cited in Bush, 2003, p. 5) suggests that the influence of a transformational leader is most crucial to the following eight areas of school conduct:

- building school vision;
- establishing school goals;
- providing intellectual stimulation;
- offering individualized support;
- modelling best practices and important organisational values;
- demonstrating high performance expectations; and
- creating a productive school culture; and developing structures to foster participation in school decision making.

Of the eight, the following three are the most relevant to the field of ICT: (1) building school vision, which means inspiring teachers to get involved with technology by developing and articulating a particular vision for ICT at the school; (2) offering individualized support, which implies concern and respect for the personal needs of teachers during the implementation of ICT; and (3), providing intellectual stimulation, which means challenging teachers to learn new technological skills, so that the whole school may benefit from their increased professionalism.

Leithwood, (cited in Cashin et al., 2000, p.1) defines transformational leadership as that which:

> … facilitates a redefinition of people's mission and vision, a renewal of their commitment and the restructuring of their systems for goal accomplishment. It is a relationship of mutual stimulation and elevation that converts followers into leaders and may convert leaders into moral agents. Hence, transformational leadership must be grounded in moral foundations.

Indeed, the many tasks that arise from transformation within schools transcend the capacity of any single individual. Hence, school principals who take on transformational leadership roles work together with teachers and learners to achieve a common goal. They know the capabilities of each team member and take advantage of their staff's diverse experiences to promote greater creativity.

Thus, it seems as if the main role of the principal in the integration of ICT is to make sure that their school's vision, mission and policies incorporate the presence of technology. In incorporating technology, it is expected that the principal will oversee changes in the organisational structure of their school, so that the necessary physical infrastructure can be set up and maintained, and that their staff can be properly trained in the use of ICT equipment. In other words, school principals need to plan and execute implementation strategies through the establishment of suitable, responsible organisational strategies (Pelgrum & Law, 2003, p.79). I argue that the tenets of transformational leadership may serve as appropriate guidelines for principals as they endeavour to install these strategies in their schools.

2.5.1.1 Building a Technology Vision

One world leader to have recently embraced a vision of change is American President Barack Obama. In his inaugural speech, Obama articulated his vision as follows

> I will set big goals for this country as president - some so large that the technology to reach them does not yet exist…I will recruit new teachers and make new investments in rural schools; we'll connect all of America to 21st-Century technology and telecommunications.

Obama's words show the importance of vision in leadership. Kavanagh and Ashkanasy (2006, p. 81) have stressed that "change is accomplished through the leader's implementation of a unique vision for the organisation …designed to change internal organisational cultural form". Information and Communication Technology Professional Development (2008) define vision as "a concise statement about where the school wants to be at a certain point in the future".

In the context of this study, it is important for schools to have an ICT vision that embeds all ICT technology into its teaching and learning practices. Several writers observe that the successful integration of technology requires leaders to articulate and develop a vision for innovation and change (Chang, Chin & Hsu, 2008; and Wagner, 2003). Without a vision, and measures to ensure its implementation, the changes that are expected to be brought about by the introduction of technology will not be realised. Several researchers (Fridell & Alexander,

2005; Leithwood, 1994; Akbaba, 2004; Yuen & Cheng, 2000, p. 198) identify vision building as one of the major practices that motivate educational change. Furthermore, Becta (n.d) has also recently emphasised the importance of an ICT vision for every school equipped with modern technology (http://schools.becta.org.uk).

Moreover, Fridell and Alexander (2005) emphasise that "since vision is focused on change, it should be not regarded as permanently fixed, and should change as the culture of the school's community changes". Wilmore and Betz (2000) agree, stating that "vision should not be regarded as a model of the future, but as an evolving mission that must respond to changes in circumstances over time".

Furthermore, other members of staff should participate in the formulation of the school's vision. Sergiovanni (cited by Wilmore & Betz, 2000) contends that "it is not a matter of making others follow [the principal's] vision but more of developing a shared vision". This view has recently been echoed by UNESCO, as follows:

> ...the vision should not be created by a single person or through top-down process starting from the MoE. It is crucial to involve those who have a stake in the outcomes, including teachers, parents, students, and the community, and allow them to assist in the creation of the vision by contributing their knowledge, skills, and positive attitudes (2004, p. 77)

Wallance (1996, p. 12) identifies two elements that are important in developing a shared vision, (1) that it requires extensive dialogue between the key stakeholders to agree on a statement of beliefs about the desired future, and (2) that it requires each participant to think seriously about their personal beliefs regarding knowledge, learning, teaching and assessment.

Senge (1990) and Moloi (2002, p. 50) highlight shared vision as one of the five important disciplines for schools seeking to become learning organisations. According to Moloi (2002, p. 50) a shared vision is important, as it keeps the school on course and helps to align its current practices with what it wants to achieve in the future. Moloi (2002, p. 50) further adds that "a shared vision enables the school to measure whether the actions taken by teachers are moving in the desired direction". On the same note, UNESCO (2002, p. 73) views the establishment of a shared vision as a sign that commitment to technology is systemic,

signifying a common understanding of the importance of technology on the part of its implementers.

Case studies carried out by Law et al. (2000) on the implementation of ICT in schools in a number of countries have indicated that the challenges posed by ICT integration depend on both the values embodied in the change, as well as the existing culture and values of the educational institution concerned. Pelgrum and Law (2003, p. 78) note that "for changes to be institutionally sustainable, it is critical to unite disparate individual aspirations into a collective commitment to a common goal". Thus, a process of vision building must accompany planning for ICT implementation, so that all stakeholders involved in the process can engage in sharing their individual understanding and aspirations, and seek to establish a goal that is endorsed by all parties.

For the integration of ICT to be effective, Flanagan and Jacobsen (2003) also stress that "its introduction should be accompanied by opportunities for staff, learners and parents to develop a common vision and shared purpose". This is what one expects from transformational leadership. However, a transformational approach to leadership is a necessary, but not sufficient, condition for school improvement. According to Hopkins (2001, p. 118), "transformational leadership lacks a specific orientation towards student learning", a key feature of instructional leadership, which shall be discussed later on in this chapter.

2.5.1.2 The School Principal as an Agent for Change

> The people who resist change will be confronted by the growing number of people who see that better ways...are available thanks to technology.
>
> – Bill Gates

As explained earlier, the integration of computers into teaching and learning involves some forms of change and requires schools to manage this transformation process. In order to manage change effectively, school principals need to know the nature of the proposed changes, and formulate processes by which they might be realised. However, Fullan (2001, p. 3) cautions that "not all changes lead to school improvement. Some changes can cause disturbances and reduce productivity". As identified by Newhouse (2002, p. 47), the

introduction of computers in schools produces a compound effect, requiring that classroom practices be reorganised. This, in turn, causes an evolution in the role of the teacher in the classroom.

Yet, the fact remains that within schools that are improving, Harris (2002, p. 35) notes that “a culture of change exists”. That is to say, schools that are improving show themselves to be responsibly and suitably committed to transformation.

Much of the research carried out on barriers that hamper the use of computers in schools identifies resistance to change amongst implementers of ICT as an important factor. In the area of curriculum implementation, Harvey (cited by Ornstein and Hunkins, 2004, p. 310) identifies several reasons why employees may resist change. These are:

- Lack of ownership: Individuals will not accept change if they consider it alien or coming from outside their organisations.
- Lack of benefits: if teachers are unconvinced that a new program will make things better for students or themselves, they are likely to resist the suggested change.
- Increased burdens: often change simply means more work, increasing the burden placed on teachers.
- Lack of administrative support: people will not embrace change unless those officials responsible for the program have shown or guaranteed their support for change.
- Insecurity: people resist that which appears to threaten their security. The instinct to survive is strong and few will venture into programs with obvious threat.
- Norm incongruence: the roles and assumptions of new programs must be congruent with the norms and expectations held by personnel in the system.
- Boredom: No one accepts a new program believing that they will not enjoy the experience of implementing it.
- Differential knowledge: If we perceive those persons advocating change to have considerable more information than we, we may well consider those people as persons as having excessive power.

- Sudden wholesale change: people tend to resist major changes, especially about facets requiring a complete redirection.

- Unique points of resistance: sometimes, it is the unknown that surfaces and retards change.

Of these ten reasons, lack of support, lack of ownership, insecurity, and increased burdens are most relevant to ICT, and have already been discussed at some length. Suffice it to say that principals play an important role in mediating change, and – through good leadership – can help their schools overcome these possible causes for resistance to transformation.

Research also identifies various factors that lead to changes in learning organisations. Saville (cited in Van der Westhuizen, 1991, pp. 646-647) recognises evolutions in technology as one of four categories of change observed in educational systems. The other three, which are relevant to the current study only insofar as they reflect the demands of ICT, are changes in procedure, objectives, and curriculum development. Several authors (Rockman and Sloan, 1993; Fullan, 2003; Schiller, 2003; and Wilmore & Betz, 2000) identify the school principal as the key player in ensuring that change takes place within schools. Therefore, van der Westhuizen (1991, p. 646) argues not only that the school principal fills a key role in any change taking place within their school, but also that staff members are inclined to accept programmes of change more readily if the principal actively supports them.

In research on the role of primary school principals in implementing computer education in Australia, Schiller (1991) studied the relationship between the style in which change was facilitated, and the success of its implementation. The study investigated Computer Education in six urban schools, and combined both qualitative and quantitative methods for gathering data. Interventions made by school principals were classified into styles labelled initiator, manager and responder. The study found that implementation success was greater at schools where the principal demonstrated an ‘initiator’ facilitation style, compared to a ‘manager’ or ‘responder’ style. Thus, it seems as though the way in which the principal shoulders the responsibility of transformation within their school – what style or strategy of implementation they employ – greatly affects the success of the change process.

As described above, the principal's role in supporting the change process might stimulate feelings of dedication among teachers. Schiller (1991) recommends that "principals work collaboratively with teaching staff to effectively lead the integration of technology in their schools". Yee (2000) also emphasises the importance of the school principal in leading change, noting that they should commit to their staff's professional development by providing ICT training. He further argues that "school principals should inspire a shared vision for the comprehensive integration of technology, and foster an environment and culture conducive to the realisation of that vision".

2.5.1.3 Developing an ICT Culture

> Culture is pervasive; it influences all aspects of how an organisation deals with its primary task, its various environments, and its internal relations. (Schein, 2004, p. 14)

The way in which ICT is used is becoming an important facet of school culture, with some schools seeing it as a key subculture that can empower pupils' learning and make radical changes to the way the school operates. Kapusuzoğlu (2007) defines organisational culture as "a set of deep-rooted values and beliefs in an organisation, expressed non-verbally". In addition, Kapusuzoğlu claims that "organisational culture is a permanent variable that, if infected, will be difficult to remedy". Bush (2003, p. 169) and Schein (2004, p. 11) identify the leader as the main player who creates and sustains the culture of an organisation, and communicates its core values to external stakeholders. However, the role that principals play in establishing the organisational culture of schools differs from that of a big institution where the leader is solely responsible for making decisions and enforcing control. In learning organisations, the leader's responsibilities are aimed at improving teaching and learning. Schools have often been described as dynamic learning systems, where people continually improve their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured (Senge, 1990, p. 3). Kapusuzoğlu (2007) identifies the following three functions fulfilled by principals, as leaders of change in improving teaching and learning: (1) designer, (2) teacher, and (3) supporter. Principals as designers, have the responsibility of planning all ICT activities, and consolidating these activities with the vision

and mission of the school. Mark, Tucker and Codding (2002, p. 32) note that "when designing activities, all the proposed work should be aimed at achieving high performance, and it should be built on the core principles of teaching and learning". As the lead teacher, the principal is responsible for providing strategic ICT development and training. As supporters of learning, the principal is responsible for helping staff form relationships between each other, so that knowledge can be transferred within the school body.

Senge (cited in Hesselbein, Goldsmith, Beckhard, 1996) characterises leaders as:

> Those who walk ahead, people who are genuinely committed to deep change in themselves and in their organisations. They lead through developing new skills, capabilities and understandings.

Drawing on Senge's view, I believe that the principal may be seen as the cultural leader of their school, displaying leadership that is visionary, transformative, educative, and empowering. Flanagan and Jacobsen (2003) have also identified five responsibilities of principals that can contribute to an effective ICT culture. These researchers claim that "principals need to assume the responsibilities of being the leader of learning, leader of student entitlement, leader of capacity building, leader of community, and leader of resource management within their schools".

Flanagan and Jacobsen's contribution help us to understand the fundamental responsibilities a principal has in creating an effective ICT culture. One of these is that the principal, as the leader of learning, must encourage teachers to continuously improve their ICT skills. As argued by Harris (2002, p. 73), "in order for any learning to take place at a school, the leader needs to ensure that the school is a learning environment for both teachers and students". In addition, principals should organise professional development events that focus on teaching and learning with and without ICT, and they must provide opportunities or platforms for teachers to discuss the use of technology.

As a leader of student entitlement, the school principal is responsible for ensuring that all students have access to technology. They are responsible for raising the issue of equity in staff meetings.

To create a culture of learning, the leader needs to create a vision and build the capacities of their staff. Fullan (2002) posits that "the cultural change principal is the lead learner in the school and models lifelong learning by sharing what he or she has read lately, engaging in and encouraging action research and implementing inquiry groups among the staff". As the International Society for Technology in Education (ISTE) revealed in 2006, "if we seek to improve teaching and learning by using rapidly changing technologies, school principals should make teachers aware of these new technologies and facilitate their integration into the curriculum". Harris (2002, p.74) reminds us that "the leader's vision can have a powerful impact upon the culture of a school, and can provide the direction of change and development".

Quality leadership is a key factor in building a learning community. Barth (1988) details many ways in which principals who are successful as leaders of their community are able to encourage teachers to display leadership qualities. He further mentions that it is important for school leaders to:

- Articulate the school's goals and vision as frequently as possible in meetings, conversations and community meetings,
- Surrender power, which in turn allows for more creativity on the part of teachers,
- Empower and entrust teachers with decision-making authority and then support the decisions.

In the context of ICT, the school principal should lead by example, and clearly demonstrate to their staff how technology can benefit teaching and learning. As observed by Brockmeier et al. (2005), "principals who make technology a routine part of their jobs show a commitment to it and can personally help others acquire technological expertise". To lead by example, school principals should possess computer skills and use technology whenever possible while carrying out their duties.

Fullan (2002) identifies three qualities displayed by principals who seek to bring about change within the culture of their schools, namely palpable energy, enthusiasm and hope. He also reminds us of the five essential characteristics of cultural change leadership in a knowledge-based society. These are: moral purpose, an understanding of the change process,

the ability to improve relationships, knowledge creation, and sharing and coherence-making. Benzina (2007) views leading with moral purpose as "a commitment to making a difference in the lives of others**"**. It is clear from Benzina that the central moral purpose of a school leader is to constantly improve student achievement, and ensure that achievement gaps, if they exist, are narrowed.

To summarise, as leaders appointed by the Ministry to oversee the activities of their schools, principals have the responsibility to encourage teachers to try particular methods and tools. These practices may, over time, form part of the school's culture. Thus, with the introduction of ICT into schools, the desired changes can be realised if schools possess leaders who are able to transform the culture, beliefs and practices within their respective schools.

2.5.1.4 The Role of School Principals in Staff Development

> You cannot have students as continuous learners and effective collaborators, without teachers having the same characteristics. (Sarason cited in Fullan, 1993, p. 46).

Staff development is widely considered as an essential ingredient in constructing a professional learning community. As the overseer of all their school's resources, the principal is implicitly responsible for staff development.

Hopkins (2001, p. 96) defines staff development as "a central strategy for supporting teachers as they engage in improvement activities". As suggested by Fullan (1993, p. 46) "teachers encounter difficulties when they are faced with innovations". In respect of ICT, teachers become faced with the challenge of acquiring new skills as they learn how to use computers, and so it is necessary to constantly work on upgrading their computer skills. According to Jones (cited in Law, Pelgrum & Plomp, 2008, p. 94), this lack of confidence and competence among teachers is a major obstacle to the effective implementation of ICT in schools. Jones (2008) counts a lack of time for training, a lack of computer-based pedagogical experience, and a lack of suitable opportunities among the reasons why teachers lack confidence in making use of ICT.

Pelgrum and Law (2003, p. 58) claim that "when planning staff development in schools, different professional roles should be considered". Pelgrum and Law (2003) identify these roles as (1) informatics teachers, (2) subject teachers for different subject groups, (3) computer coordinators, and (4) school principals. Pelgrum and Law further observe that "staff development and research has shifted away from informatics, as the number of teachers involved is too small". They note that "staff development has shifted to training all teachers to integrate computers into their teaching and learning". Applying Pelgrum and Law's roles to the Namibian context implies that staff development must be carried out on four levels: ICT literacy, ICT integration, ICT for subjects and ICT for administrators. As a strategy to equip teachers with ICT skills, the Ministry of Education cascades on-site ICT literacy training to serving teachers (Namibia. MoE, 2006, p. 21). The ICT literacy training will be followed by on-site ICT integration training for educators. This training is also to be cascaded, in schools that are already making use of ICT.

Harris (2001, p. 59) likewise observes that the "provision of training and support for staff is essential to any school improvement". Effective ICT integration requires support for ongoing, timely professional development that focuses on computer-based teaching and learning. Jacobsen (2001) identifies the following characteristics of effective professional development: coaching; on-site services, individualized instruction; observation of ICT integration in practice; and self-directed learning. Fidler & Atton (1999, p. 22) state that "staff development can be achieved either through training courses or through planned experience". Becker (cited in Hamilton, Klein & Lorie, 2000, p. 26) contends that "research indicates that teachers' willingness to use computers is influenced by the availability of professional development opportunities and on-site help." Therefore, it seems as if the willingness of teachers to use computers is influenced by the availability of professional development opportunities and on-site help.

Van der Westhuizen (1991, pp. 273-274) highlights the importance of a staff development in terms of the realisation of school objectives, noting that:

> When an educational leader has the right attitude to personnel development and training, the chances are much greater that the teaching/educational situation in each classroom will be maximally effective and take place to the advantage of the pupils.

Although van der Westhuizen might not have been referring to technology, his emphasis on the importance of holding correct attitudes to staff development is apposite to the challenges raised by the introduction of computers in schools. For teaching and learning to be maximally effective, the school leader should see to it that both they and their staff remain on the forefront of new developments in the field of technology. Recent studies show that if principals support teachers in using technology, by employing appropriate strategies for staff development, teachers will show sustained integration of ICT in their curriculum.

In summary, school principals play a central role in providing continuous development opportunities for their staff. As suggested by Pont et al. (2008, p. 49), it is essential that school principals embrace this aspect of school leadership as one of their key responsibilities.

2.5.2 The School Principal as an Instructional Leader

The constant emphasis of the above sections on transformation in the educational context has also made reference to transformational leadership, as time and again research shows that when schools are faced with change, it is imperative that this change is mediated and directed by a strong, capable leader. However, as I indicated earlier, transformational leadership is a necessary, but not sufficient, condition for school improvement. According to Hopkins (2001, p. 118), this is because "transformational leadership lacks a specific orientation towards student learning". This orientation is a key feature of instructional leadership.

According to Philips (n.d) "Instructional leadership requires that principals function less as managers or administrators of their schools, and begin to serve their schools as academic leaders". Hoy and Miskel (2005, p. 40) state "that instructional leadership covers those actions the principal takes, or delegates to others, to promote growth in student learning". For Mazibuko (2003, p. 18), "the principal as an instructional leader should assist educators to alter, rearrange, and reinterpret the curriculum". Applying Mazibuko's (2003) view of instructional leadership to the issue of ICT integration in Namibia means that school principals, firstly, need to assist teachers in using technology to access, analyse, and interpret student performance data, and secondly, need to use this data to appropriately design, assess, and modify student instruction. It also means that principals must collaboratively design,

implement, support, and participate in professional development for all instructional staff, so that the effective integration of technology and the improvement in learning that it brings may be institutionalised.

As instructional leaders, principals are responsible for facilitating the integration of technology into the school's curriculum. Whitaker (1997, p. 151) identified four skills essential to instructional leadership:

- Firstly, they need to be resource providers; principals should recognise and acknowledge exemplary teachers and encourage them to share their skills with others.
- Secondly, they need to be an instructional resource. Teachers count on principals to be sources of information on current trends and effective instructional practices. Principals should know current issues related to the curriculum, effective pedagogical strategies and assessment.
- Thirdly, principals need to be skilled communicators. Effective school principals need to communicate their essential beliefs with regard to what promotes good learning.
- Lastly, principals need to create a visible presence. This means that they should reinforce behaviour that promotes learning, and design instructional programmes and activities.

Anderson and Dexter (2005) report that "the success of implementing technology in schools is seriously threatened if key administrators do not become actively involved in the process". With regard to instructional leadership, the principal should know about different models of computer-based teaching and the theories underlying educational technology. As suggested by Gosmire and Grandy (2007), in promoting the integration of technology in the classroom, "the principal must pay attention to the abilities of learners, and set up conditions that support teaching and learning in a technology-based environment".

In their survey of secondary school principals, Berlin et al. (cited by Ornstein & Hunkins, 2004, p. 323) determined the top 10 functions that school principals fulfil as curriculum leaders. These are:

(1) Developing an orientation programme for new teachers
(2) Developing a clear set of goals and objectives
(3) Involving individual departments in curriculum development

(4) Encouraging communication among schools within the district
(5) Handling controversial curriculum issues
(6) Spending time visiting teachers in the classroom
(7) Planning staff development programs
(8) Rewarding curriculum innovation
(9) Encouraging the use of the library and media services among teachers
(10) Modifying the school environment to improve instruction.

These considerations aid in explaining how the principal, as an instructional leader, must lead and coordinate the implementation of the school's curriculum. As emphasised in section 2.5.1.1, the principal should establish a vision to direct curricular activities in their school, and this vision should incorporate issues relating to ICT if schools wish to integrate computers into their teaching and learning practices.

In a study carried out by the National Association of Secondary School Principals in 2001, 10, 000 people were questioned about their views on the role of principals, teacher recruitment and retention, impediments to effective high school leadership, and professional development. The study found that principals spend much of their time dealing with parent issues, discipline, community relations and the management of facilities. In the same study, principals identified establishing a learning climate, working with personnel and providing curricular leadership as their most important roles. However, Miller (2001) suggests that "if principals wish to engage more in instructional leadership, they should reduce the time they spend on concerns relating to parents and other (non-instructional) management issues".

Research has shown that the role of the principal, as an instructional leader, is to provide curricular direction, monitor the progress of teaching and learning, provide feedback if necessary, and facilitate staff development. In conclusion, the striking and different role of the principal as an instructional leader, as observed by Brewer (2001), requires that "principals focus on instruction as a means to create a climate of integrity, inquiry, and continuous professional improvement at their school".

Although schools need to be led by individuals who make a difference, leadership has to be replicated right through the organisation and found in every aspect of school life (Harris, 2002, p. 78). This conception calls for another form of leadership, where power and decision-

making are shared among some or all members of the school's staff. As delegation of ICT activities to a single teacher or a group of teachers has became the norm in most schools, in the next section I shall briefly give an overview of teacher leadership, and explain the role of teacher leaders. The overview shall be brief, as my study is focused on the role of principals as implementers of ICT in schools.

2.5.3 Teacher Leadership

The literature I have reviewed suggests that effective leadership is a central component of securing and sustaining school improvement. Day, Harris and Hadfield (2001) & Harris (2002, p. 77), write that one of the most consistent findings in recent studies is that leadership authority need not lie solely with the principal, but may be dispersed within the school among and in between staff members as well. In Namibia, the Namibian MoE (2007b, p. 7) reports effective delegation practices in 64% of secondary, 60% of primary, and 75% of combined schools that were visited by the NESSE teams. This distribution of authority translates into the empowerment of teachers, as they are encouraged to participate in the formulation of goals and policies. Blase and Blasé (cited by Hung, 2003, p. 3) posit that "principals who empower teachers, rather than merely expect them to implement someone else's vision for the school, will significantly enhance teacher's respect and dignity, and will help them to be more responsible for work-related decisions". By implication, empowering teachers entails that the leader does not impose goals on followers, but works with them to create a sense of common purpose and direction.

Senge's (1996) system of thinking suggests that there are independent leaders within an organisation who may help to bring about development**.** He identifies several types of distributed leadership in an organisation: local line leaders, executive leaders and network lines. The local line leaders, in the context of a school, resemble classroom teachers. At the introduction of computers in the school, these teachers work together in a team developing their own skills and then begin to apply those skills to their teaching. In an ICT classroom, the teacher leads and manages learners in using the available ICT purposefully. Following the national reform of school curricula in 2008, Namibian teachers are expected to integrate ICT

into their teaching practices. It is expected that they become the champions of ICT in the classroom.

Within the school setting, executive leaders resemble the technology committee and school management team that is tasked with drafting ICT polices and developing strategies for integrating technology successfully. As indicated by the Namibian MoE in the *Guidelines for School Principals* (2005, p. 143), "a system of committees and meetings is an effective management tool for ensuring wider input, and increased participation of staff in the school's decision-making processes". In the area of educational technology, Anderson and Dexter (2000) have called for the establishment of committees to manage technology issues at schools. Harris (2002, pp. 77-78) identifies the qualities of teachers selected to serve in a committee as having dynamic and outgoing personalities, with high levels of commitment to their roles. Gosmire and Grandy (2007) emphasise the involvement of the school principal in these committees. They note that "the principal must step up and lead the charge by serving as a member of the technology committee, empowering the committee to design and implement the school's technology plan". Principals should also represent the technology committee's interests, and show public support for it, whenever possible.

The networked leader resembles the informal leaders who help teachers to get additional resources from somewhere working in line with leaders (classroom teachers and computer coordinator teachers). The network leaders have the insight to help computer coordinator teachers to move forward and make changes happen across the school. However, networked leaders can do little to counter hierarchal authority. If a local line leader becomes a threat to peers or supervisors, they may be powerless to help him or her.

Finally, the Namibian MoE (2005, p. 143) also emphasises the importance of distributing power among teachers and other stakeholders within the school. The principal should involve various stakeholders – such as senior teachers, a computer science teacher, and a representative for learners – in decision-making processes. Once a technology committee has been established, the principal can then delegate work relating to ICT to members of the committee. The principals task is to manage and monitor everything that is happening.

2.5.2.1 Conceptualisation of teacher leadership

Research surrounding the meaning of teacher leadership produces various findings (Muijs & Harris, 2005). However, most commonly it is interpreted as comprising the formal leadership roles that teachers undertake that have both managerial and pedagogical facets (Muijs & Harris, 2005). In schools, leadership roles such as this are usually filled by heads of department, subject heads, and computer coordinator teachers. Wasley (1991, p. 23) defines teacher leadership as the ability to "encourage colleagues to change, to do things they would not ordinarily consider without the influence of the leader".

Gonzales & Behar-Horenstein (2004) provide two understandings of the concept: a traditional one, and a broader perceptive. The traditional understanding of teacher leadership is that of limited power, and the work of teachers as leaders is defined by their formal positions in respect of other teachers. In contrast, a broader understanding of teacher leadership can be defined as those individual teachers who participate in some or other form of leadership in the school, such as facilitating professional development through workshops, modelling teaching strategies in the classroom, taking on formal leadership roles in departments or teams, or participating in shared decision-making (Gonzales & Behar-Horenstein, 2004, p. 21).

2.5.2.2 The Role of Teacher Leaders

Teacher leaders, as suggested by various researchers and writers, assume various roles in supporting teaching and learning in schools. Harris (2002, p. 79; & 2003) suggests four discernable dimensions to the role of teacher leaders. The first role concerns how the teacher leader can negotiate ways in which the proposed change or development can be directly linked to the school's curriculum. With this role, the computer teacher leader ensures that links between the entire school and the classroom are in place, and that opportunities for meaningful development among teachers are enhanced. The role of the school principal towards the realisation of the first role is to work in collaboration with teacher leaders in creating a shared vision that directs the school community to their intended purpose for acquiring ICTs.

The second role focuses on empowering teachers and giving them some ownership over any particular development or change. Harris (2002, p. 79) notes that "here emphasis is placed on participative leadership, so that all teachers feel as though they are part of the change or development". In the classroom, the technology teacher leader could provide support to individual teachers, so that they feel involved in any changes in pedagogical method that the introduction of ICT might demand. Paramount to the teacher leader's role is the role that the school principal plays in empowering staff members and teacher leaders. Terry (n.d) suggests that "a principal create an environment conducive to empowerment, demonstrate empowerment ideals, encourages all endeavours towards empowerment, and applauds all empowerment success".

The third dimension of teacher leadership in school improvement is the mediating role that teachers play. Teacher leaders are important sources of expertise and information. They are able to draw critically upon additional resources and expertise if required, and seek external assistance. However, literature suggests that school principals should support teacher leaders by seeking opportunities where teacher leaders can learn new things.

The last role identified by Harris (2004) is that of forging close relationships with individual teachers, through which mutual learning takes place. In a school environment, Gabriel (2005, p. 13) observes that the role of the technology teacher leader is to coordinate the team's technology needs and to serve as the trouble-shooter when glitches occur. He further notes that, where a school has a technology committee, this person serves as the mediator within the group, and assists in making decisions concerning the school's ICT policy. Therefore, if teachers attend a conference or workshop, the principal should set up platforms where teachers share what they have learned to the rest of the staff members when they return to the school.

However, they are concerns about the effectiveness of teacher leadership, as teacher leaders have to forgo their lessons to help other teachers. Miller and Lord (2000) posit that "teacher leaders feel discomfort in being seen as separate from other teachers as a result of their added responsibilities". Another shortfall of teacher leadership, as pointed out by Moller and Katzenmeyer (1996), is a lack of leadership training for teacher leaders. This arises because they are made leaders based on the perception that they are great teachers, and the mistaken

assumption is that they can also be great leaders without any further training to prepare them for this role.

2.5.2.3 Barriers Preventing and Sources to Support Teacher Leadership

The literature review I conducted offered some insights into conditions that impede or support teacher leadership. It is suggested that teacher leadership can only be fostered and nurtured in a school culture that is supportive and where relationships between staff are positive. Muijs and Harris (2005, p. 93) argue that "a high degree of trust is required for teachers to lead initiatives, instead of the senior management team, and therefore in schools where the culture is not collegial the possibility of teacher leadership is reduced".

Zin (1997) investigated teacher leadership and grouped her findings into two categories: factors that support it and those that impede it. She further subdivided these categories by identifying three sources of influence on teacher leadership, namely: conditions within the educational context, conditions outside the educational context, and internal factors. Conditions within the educational context that can impede teacher leadership include insufficient time, lack of support and involvement from other teachers, inconsistent administrative support or modelling for teacher leaders, ill-defined and overly broad leadership roles, and physical barriers. Conditions emanating from outside the educational context include family and other responsibilities competing with leadership roles**,** personal health problems, cultural or religious values which discourages leadership endeavours, media reportage maligning the work of schools and teachers, stereotypical and negative perceptions of educators and women by family members and others, and a lack of role models among contacts outside of the school. Finally, internal factors include: discomfort with leadership roles; feelings of frustration and discouragement; stress and anxiety about taking on more work; self-perception of lacking expertise to assume a leadership role; reluctance to alter the status quo; and professional stagnation, resulting in less interest in taking on new roles.

The lessons from these barriers are that other people's attitudes and actions influence teacher leadership in ways that either enhance or diminish it. As suggested by Zin (1997) teacher leaders and people in their environments must recognize the impact of interpersonal

relationships, and if they wish to enhance teacher leadership, they should act in ways that consistently support it. Secondly, unwritten institutional norms and expectations, as well as formal and informal policies and procedures, have considerable impact on teacher leadership. If principals wish to support teacher leadership, they must minimise structural barriers within the educational context that inhibit it, and maximise existing structural features that support it. Thirdly, teachers are human beings, who exist within a complex network of supporting and constraining factors, both in their professional and personal lives. School principals who wish to support teacher leaders must recognize that sometimes either anticipated or unforeseen circumstances arise in their personal lives, which necessitate reductions in time or energy spent on professional endeavours.

To summarise this section, the main aim of implementing teacher leadership is to empower teachers to be involved in decision-making within the school, and so to contribute towards improving teaching and learning. However, this form of leadership presents its own challenges, such as the need to properly support teacher leaders, and to minimise the barriers that might affect their efficacy. As observed by Kennewell, Parkinson and Tanner (2000, p. 155), "ICT is too important to be left in the hands of those in middle management". Those in managerial roles (school principals and heads of department) should support computer teachers, and give them authority to manage computer activities. This review of literature suggests that administrative support is crucial in determining whether or not teachers are able to integrate technology into their curricula. The primary role of the school principal in this regard is to establish an environment within their school that nurtures democratic, shared leadership that is characterised by a high degree of openness and trust, and where any policy can be challenged or questioned (Gonzales & Behar-Horenstein, 2004).

2.6 Conclusion

The accelerated diffusion of ICT into schools has increased and changed the leadership role of principals. As schools acquire more computers, the principal's role has shifted from that of manager and administrator of resources to that of leader of learning, leader of student entitlement, and leader of capacity building.

This chapter discussed the role of principals in supporting the use of computers in schools. However, there is substantial theoretical evidence that school leadership is not premised on individual endeavour, but rather on collaborative action involving all members of staff. In delegating ICT activities to teachers, principals must be willing to relinquish their traditional roles of authority, not only allowing teachers to have a greater voice but also providing them with support and establishing an environment of trust within the school.

In the next chapter I shall present my research methodology.

Chapter 3

Methodology

3.1 Introduction

To provide a detailed description of how school principals supported and ensured the effective use of computers in schools, I embarked on an interpretive research project. To achieve that goal, the research was guided by the following questions:

1. What are the principals' perceptions of their role in promoting computer usage in their schools?
2. What guides principals in their quest to promote the use of computers in their schools?
3. What are the obstacles that principals face in ensuring the effective use and management of computers in schools?
4. What intervention strategies do principals employ to encourage the use of computers at school?
5. How do teachers perceive the role of school principals in supporting computer usage in schools?

This chapter presents my research methodology. Firstly, I present a justification for using an interpretive approach to the research (Section 3.2). Next, I discuss my main methodological approach – that is, my employment of a case study (Section 3.2.1). This is followed by a discussion of the measures taken to validate the data I collected (Section 3.2.2). Next follow descriptions of the research participants (Section 3.2.3), and my role in the research project (Section 3.2.4). This will be followed by outlines of my sampling procedures (Section3.2.5) and the tools I used for data collection (3.2.6). I end the chapter by discussing ethical considerations (Section 3.2.11).

3.2 Research Design

The study presented here draws from social sciences to investigate the role of principals in supporting teachers' use of computers in schools. McMillan and Schumacher (2006, p. 22) define research design as the plan and structure of the investigation, used to obtain evidence to answer the research questions. The literature on research identifies two well-known approaches: quantitative research and qualitative research (De Vos, Strydom, Fouchê & Delport, 2005, p. 73; and Welman, Kruger & Mitchell, 2005, p. 6).

Quantitative research underlines the natural scientific method in human behavioural research, and holds that research must be limited to what we can observe and measure objectively (Leedy & Ormrod, 2005, p. 96). It conducts itself independently of the feelings and opinions of individuals. According to Creswell (1994, pp.1-2), the "quantitative approach takes scientific explanations to be nomothetic, aimed at testing hypotheses and to predict or to control human behaviour". The intent is to establish, confirm, or validate relationships and to develop generalisations that contribute to the theory (Welman et al., 2005, p. 6). In collecting data, concepts, variables, hypotheses and methods of measurement are defined before the study begins and remain unchanged throughout. Quantitative researchers choose methods that allow them to objectively measure the variables of interest. In addition, they try to remain detached from the research participants so that they can draw unbiased conclusions. This detachment is maintained through methodological controls. In order to analyse relationships and regularities between various elements, positivist research occurs in a controlled setting using valid and reliable instruments to gather information through random sampling. In analysing data, quantitative researchers rely heavily on deductive reasoning, beginning with testing hypotheses and then drawing logical conclusions from them (Leedy & Ormrod, 2005, p. 96).

Those supporting an alternative way of understanding, that opposes mere description and generalisation, point out that people are not plants or chemicals, and therefore variables can often not be identified, nor isolated, controlled or measured (Irwin, 2004, 2). Critics also question positivism's ability to be completely objective. According to Leedy and Ormrord (2005, p. 96), "detractors claim that positivism has absolutised the natural scientific method

of studying, and so cannot serve in interpreting events". Instead, qualitative researchers seek a better understanding of complex situations, in which they enter into the research with open minds, prepared to immerse themselves in the complexity of the situation and interact with the participants. In qualitative research, researchers operate under the assumption that reality is not easily divided into discrete, measurable variables. According to Leedy and Ormrod (2005, p. 96), "in qualitative research the researcher cannot be detached from the research participants, because the bulk of their data collection is dependent on their personal involvement with them." Therefore, there is an irreducible interpretive element to qualitative research.

The current study is predominately interpretive. The interpretive paradigm was deemed appropriate for this study because it allows the researcher to develop an understanding of the meaning or nature of the experiences of others. Cresswell (2003, p.18) defines the qualitative approach as:

> one in which the inquirer often makes knowledge claims based primarily on constructivist (i.e. the multiple meanings of individual experiences, meanings socially and historically constructed, with an intent of developing a theory or a pattern) or advocacy / participatory perspectives or both.

Moreover, Gillham (2000, p. 10) explains that "qualitative methods focus primarily on the kind of evidence (what people tell you, what they do) that will enable you to understand the meaning of what is going on."

My research was carried out at the schools where participants were working. "A qualitative approach research is naturalistic, in that researchers go where the action is" (McEwan & McEwan; 2003, p. 78). Rossman and Rallis (cited by Cresswell, 2003, pp, 181-182) identify the following characteristics of qualitative research:

- It takes place in the natural setting.
- Qualitative researchers use multiple methods that are interactive and humanistic.
- In qualitative research, research questions may be changed and be refined as the inquirer learns what to ask and whom it should be asked of.

- Qualitative research is fundamentally interpretive. This means that the researcher divines meaning from the data.

In qualitative research, the researcher has direct contact with and gets close to the participants, as they try to make sense of or interpret the phenomenon being investigated. This is why, according to Cohen et al., (2008, p. 21), the "interpretive paradigm is characterised by concern for individuals."

Furthermore, Creswell (1993) identifies five genres traditionally employed in qualitative research, namely: (1) biography, (2) phenomenology, (3) grounded theory, (4) ethnography, and (5) case study. To gain an in-depth understanding of the role of the principals in the four schools, and to make meaning of their experiences, this study adopted a case study approach.

3.2.1 Case Study

The aim of this case study was to understand the role of principals in supporting and ensuring the effective use of computers in their schools. Bloor and Wood (2006, p. 27) define case study as "a strategy of research that aims to understand social phenomena within a single or small number of naturally occurring settings". Merriam (2009, p. 203) identified "case study as providing a holistic, intensive description and analysis of a single, bounded unit". Before embarking on the present study, I could not locate any previous research conducted into the role of school principals in promoting and managing computer usage in Namibia. Leedy and Ormrod (2005, p. 135) argue that a "case study is suitable for learning more about a poorly understood or little known situation". Management of ICT in Namibian schools can be considered a new phenomenon, about which little is known.

The study presented here focused on school principals, in their daily roles as managers and leaders of ICT in schools. The study was carried out in the natural settings of the participants. Gillham (2000, p. 11) asserts that "one of the major distinguishing characteristics of case studies is that the researcher tries to understand people in terms of their own definitions of the world". He adds that "to understand people, you need to study them in their natural setting" (Gillham, 2000, p. 11).

Critics of case studies have argued that their findings cannot be generalised to include larger populations. However, those in support of case studies have argued that they are undertaken only to make specific cases understandable, and not so that the findings can be generalized (Stake, 1995, p. 85; & Wolcott, 1994, p. 364). Although the findings of the present study are restricted to its context, an understanding of them can help in understanding cases of a similar context.

Furthermore, critics describe qualitative research as 'subjective,' and therefore inherently unreliable. Critics maintain that participants may lie, distort the truth, or withhold vital information, and that in such cases the researcher is misled by incomplete, inaccurate and biased data (Becker cited in Sherman & Webb, 2001, p. 131). Yin (2003) identifies three ways in which subjectivity in qualitative case studies can be overcome. He suggests that using multiple cases of evidence, establishing a chain of evidence, and having a draft report reviewed by informants can achieve this (p. 35). In an attempt to overcome subjectivity, the present study made use of multiple methods and multiple sites for data collection.

3.2.2 Validity and Reliability

Most researchers recognize the need for accuracy in measurement and logicality in interpreting the meaning of those measurements. Jupp (2006, p. 311) defines validity as "the extent to which conclusions drawn from research provide an accurate description of what happened, or a correct explanation of what happens and why". Reliability refers to "the extent to which research findings can be replicated" (Merriam, 2009, p. 205).

There are differences in how positivist and naturalistic researchers deal with concerns relating to validity. Quantitative researchers attempt to design in advance controls that deal with anticipated and unanticipated threats to validity. They design research instruments with careful control and use control groups, randomised sampling, statistical control of variables, and tests for statistical significance to ensure replication of the results (Maxwell, 2005, p. 107). However, qualitative researchers do not have the benefit of randomised sampling and the controlling of variables. In qualitative research, the subjectivity of respondents and

researchers – their opinions, attitudes and perspectives – contribute to a degree of bias. In addition, the methods of data collection, the selection of participants and the presentation of the data are further possible sources of bias.

However, several methods can be used to counter the threat of bias. In the present study, the following steps were taken to enhance the credibility and trustworthiness of the research findings. Data obtained from the three data collection tools were triangulated during data analysis. Cohen et al. (2000, p. 112 & 2008, p.141) and Fielding and Fielding (cited in Maxwell, 2005, p. 93) define triangulation as the use of two or more methods of data collection in the study of some aspect of human behaviour. Creswell (1994, p. 361) indicates that the concept of "triangulation is based on the assumption that any bias inherent to a particular data source, investigator or method would be neutralised when used in conjunction with other data sources, investigators and methods". Therefore, by using complementary methods, a researcher can counter the bias of one method with the presence of the other method.

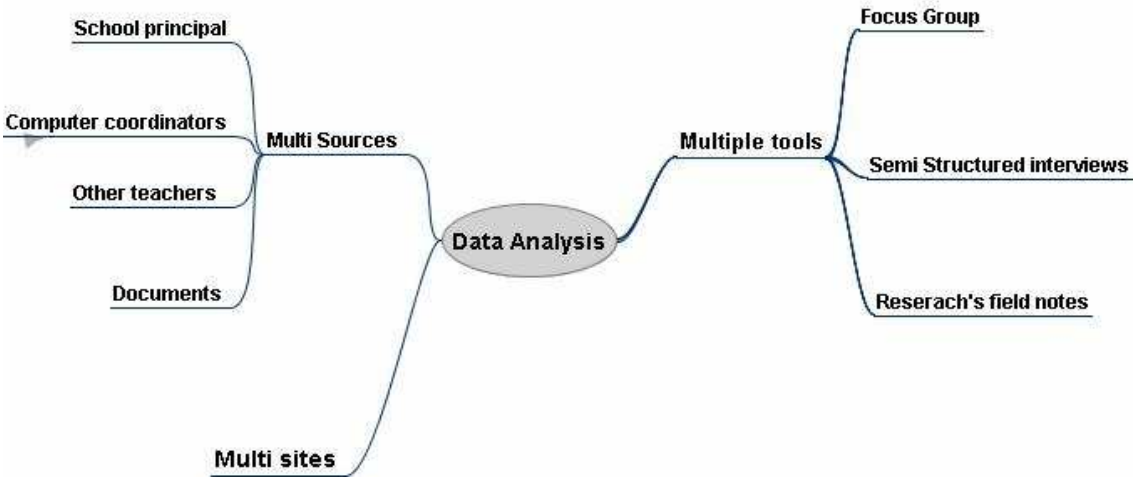

Figure 1: Triangulation strategy

In my data triangulation, I used multiple methods of data collection and multiple sources of data, with the aim of enriching and strengthening my understanding of the phenomenon without bias. Moreover, multiple sites were used when collecting data. In this study, data were triangulated in the following manner:

1. Data from interviews with principals were compared to data from interviews with computer coordinator teachers.
2. Data from interviews with principals were compared to data from the interview with the MoE official.
3. Data from interviews with school principals were compared to data from focus group interviews.
4. Data from interviews with each principal were compared to data from interviews with the other principals.
5. Interview and focus group data were compared with data obtained through document analysis, as well as observation data.

Furthermore, direct quotations were used when transcribing the data, and transcriptions were given to respondents to verify their accuracy. Participants were also allowed to delete information that made them uncomfortable. In addition, the researcher's conclusions were taken back to the participants for validation. This is known as member checking. Johnson and Christensen (as cited in Ary et al., 2006, p. 506), highlight that:

> The use of …member checking accurately portrays the meaning attached by participants to what is being studied and the degree to which the participants' viewpoints, thoughts, feelings, intentions, and experiences are accurately understood.

The researcher grew up and was schooled in the region where the research took place. I was well known to the respondents, which made them feel at ease. I revealed my work affiliations and was forthcoming about why the research was being undertaken. Participants were informed of how their confidentiality would be honoured.

3.2.3 Description of the Target Population

Johnson and Christensen (2004, p. 199), define target population as "a set of elements or a large group about which the researcher wants to generalize their sample results". There are twelve secondary schools and thirty eight (38) combined schools in Caprivi region. From this

population a sample of three senior secondary schools and one combined school was drawn employing non-probability sampling. Participates comprised of four principals and four computer coordinator teachers that were selected according to the criteria of purposefulness in terms of providing reach data. In addition, a minimum of four teachers per school were also interviewed through focus group discussions. The following criteria were used to select participating schools and teachers:

1. The targeted schools should have a computer lab that was at least one year old.
2. The teachers interviewed should be computer coordinators.
3. The teachers that formed part of the focus group should either use computers in their teaching, or use computers for administration at the school.
4. All participants voluntarily agreed to be a part of the study, as evidenced by their signing of consent forms.

3.2.4 The Researcher's Role

In qualitative research, the researcher is typically involved in a sustained and intensive experience with the participants. According to Cresswell (2003, p. 184), "the researcher being an active participant introduces a range of strategic, ethical, and personal issues into qualitative research". Patton (2002, p. 566) suggests that since the researcher is an instrument of qualitative research, they should furnish the following information:

1. What experiences, training and perspective does the researcher bring to the field?
2. What prior knowledge did the researcher bring to the research topic and the study site?
3. Who funded the study and under what arrangements with the researcher?
4. What personal connections does the researcher have to the people, program, or topic studied?

To gain access to the research site, the researcher sought permission from the Regional Office (Directorate of Education) to use the four secondary schools equipped with computer labs in

the region. Once permission was approved, the researcher personally visited the schools to negotiate access to the sites. Creswell (2003, p. 184) observes that “it is important to gain access to research or archival sites by seeking the approval of gate keepers”. Over and above seeking permission to enter the research site, the first meeting was also aimed at establishing a rapport and building trust among the research participants. The presence of rapport and trust is integral not only to securing participation for the study, but also to sustain it over time (Jones, Torres & Arminio, 2006, p. 76). In building trust and rapport, the following strategies, as suggested by Jones et al. (2006, p. 78), were employed:

1. Be clear in the expectations you have for participants, and consider the question of why someone will want to participate in that study.
2. Convey your interest in the project with your initial invitation to participate as well as well as your knowledge of the phenomenon under investigation.
3. Tune in and adjust accordingly to the cultural relevant norms, behaviours, appearances, language and value of participants.
4. Be sensitive to the impact of your presence in the research settings.
5. Consider the relationship between your own social constructed identities (e.g. race, ethnicity, age, gender, sexual orientation, social class, religion, and ability) and those of your participants, and consider what difference these might make in your ability to establish rapport and trust.
6. Pay attention to the physical environment when interviewing or observing participants. Are they in a natural setting? Or a place of their choosing? Eliminate the potential distractions that may influence your ability to be with the participants.

As a researcher in a qualitative case study, I took on the role of learner. According to Hoberg (1999, p. 183), “the researcher is a curious learner who comes to learn from and with the research participants”.

3.2.5 Sampling Procedures

Due to time constraints and other limitations, this study could not be expected to involve the entire target population in the data collection. Powers et al. (cited in De Vos et al., 2005, p.

193) define a population as a set of entities in which all the articles of interest to the researcher are represented. Instead of studying the entire population (nine secondary schools), the study resorted to drawing on a smaller group of participants (four schools). Johnson and Christensen (2004, p. 197), explain that "when we sample, we study the characteristics of a subset… selected from a larger group….to understand the characteristics of the larger group**"**. Purposive sampling was employed. Johnson and Christensen (2004, p. 215) define purposive sampling as "a type of sampling where the researcher specifies the characteristics of a population of interest, and then tries to locate individuals who have those characteristics". The participants in this research were chosen to share their experiences on the role of principals in promoting and ensuring the effective use of computers in their schools.

The sample included four secondary schools that had computer labs. The main objective of studying the four schools was not to use them to generalise to a wider population, but to learn about the role of principals in promoting computer usage. In order to access a knowledgeable sample of people, who knew about ICT management, the study focused on school principals, computer coordinator teachers and teachers who used computers at school.

3.2.6 Data Collection Tools

Three data collection tools were used to investigate the role of principals in supporting and ensuring the effective use of computers in their schools. These methods were semi-structured interviews, focus groups interviews and document analysis. In addition, field notes were taken by the researcher and incorporated into the main report. What follows is an outline of how these methods were used in the study.

(a) Semi-Structured Interviews

Kvale (cited in Sewell, 2001, p. 1) defines qualitative interviews as "attempts to understand the world from the participant's point of view, to unfold the meaning of people's experiences, and to uncover their lived world prior to scientific explanations". According to Stake (1995, p. 64), "the interview is the main road to multiple realities". In-depth, semi-structured interviews were used to discover the different ways in which the role of the principal in

supporting the use of computers in schools was perceived.

De Vos et al. (2005, p. 292) identify three types of one-to-one interviews, namely unstructured interviews, semi-structured interviews and ethnographic interviews. In the study presented here, the researcher conducted semi-structured interviews with four school principals and computer coordinator teachers. Semi-structured interviews are defined as interviews organised around areas of particular interest, while still allowing a considerable flexibility in scope and depth (May, cited in Morse, 1991, p. 189). De Vos et al. (2005, p. 296) emphasise that "semi-structured interviews allow the researcher to pursue particularly interesting revelations that might emerge from the interview, and allow participants to provide a comprehensive account of their feelings and opinions about a given subject."

The researcher and participants agreed upon a date, time and venue for the interviews. School principals were interviewed in their offices, while computer coordinator teachers were interviewed in computer labs. Before the interview, participants were informed of its purpose and procedures, and assured of how their confidentiality would be maintained. With the permission of the respondents, all interview sessions were audio recorded. Smit, Harrê and Van Labgenhoven (1995, p. 17) state that "a tape recorder allows a much fuller record than notes taken during the interview". Although no major problems were experienced, one school principal was reluctant, and it was only after I visited them three times that they agreed to be interviewed.

An interview schedule with open-ended questions was used. Holstein and Gubrium (1995, p.76) highlight that "producing a schedule beforehand provides the researcher with a set of predetermined questions, which might be used as an appropriate instrument to engage the participant and designate the narrative terrain." However, the sequence in which the questions were asked differed from participant to participant, depending on the nature of their responses.

A pilot study was carried out to detect possible flaws in the research instruments (such as unclear wording of questions, etc.), and to give an opportunity for the researcher to receive feedback on various aspects of their interview conduct (such as non-verbal behaviour, the

length of the interviews, etc.). Bloor and Wood (2006, p. 130) define piloting as “preliminary research, occurring before the main study is undertaken.” During my pilot study, a total of three teachers and two school principals from different schools were interviewed. The respondents suggested that I included a question about the extent to which teachers were consulted before the deployment of ICT in schools.

(b) Focus Group Interviews

Focus group discussions were used as a supplementary data collection tool. Krueger (cited in Kingry, Tiedj & Friedman 1990) defines focus group interviews as “carefully planned discussions, conducted in a permissive, non-threatening environment, designed to obtain perceptions on a defined area of interest.” De Vos et al. (2005, p. 299) see focus group discussions as “a means of better understanding how people feel or think about an issue, product or service.” Focus group participants are selected by virtue of having certain characteristics, which relate to the topic under discussion, in common.

The researcher asked the computer coordinator teachers at each school to negotiate access to teachers that used computers in their teaching or administration. CCTs were informed that the relationship between the participants should be equal (that is, supervisors and people they supervise could not be interviewed together). The researcher conducted one focus group interview with four teachers from an urban school, and one focus group interview with rural school teachers. Both interviews were conducted in computer labs and they were audio recorded. In addition, all interviews were conducted in English, as the participants were proficient in the language and were familiar with English computer terminology. The following procedure was used:

- The purpose of the interview was explained to the participants – this included explaining the academic and professional affiliations of the researcher
- It was explained to the respondents how their confidentiality would be maintained.
- The interview procedure was explained - this included informing participants of the length of the interview.

On a practical level it was difficult to get participants for the interview as only a few teachers

currently use computers in their teaching. For example, at one school only two teachers and the school principal used computers for teaching purposes, while at another only the CCT used the computers at the school. At schools where teachers were using computers, it was difficult to get all the participants together at the same time and place. In most cases, during morning sessions, only one of them could be available while the rest would have lessons. In the afternoons, most of the teachers were either unavailable due to personal commitments, or they were busy attending workshops or meetings.

The researcher was aware of the strengths, weaknesses, advantages and disadvantages of focus group interviews. Nyamathi and Shuler (1990, p.1284) mention that "a disadvantage of focus group interviews is that their findings cannot automatically be projected onto the population at large". Mazibuko (2003, p. 44) also notes that "the researcher should guard against a situation whereby one person dominates the interview by intervening and asking others to voice their opinions". To ensure that everybody participated equally in the discussions, the researcher intervened when one member threatened to dominate the discussion.

(c) Document analysis

De Vos et al. (2005, p. 314) define document analysis as "the analysis of any written material that contains information about the phenomenon being researched." To complement the data I collected through interviews, I analysed the following documents:

- Vision of the school with regard to ICT,
- School policy documents relating to ICT,
- Reports regarding ICT,
- Official MoE documents, such as principals' job descriptions, Guidelines for School Principals and National Evaluation Instruments.

Ary et al. (2006, p. 454) state that "documents are unobtrusive and can be used without imposing on participants." Moreover, they can also be checked and re-checked for reliability. In support of this, Cohen et al. (2008, p. 182) stress that "documents and records have the

attraction of always being available (at a low cost), and being accurate."

Although it was originally part of my plan to analyse minutes from school meetings where ICT was discussed, I could not get access to these documents. De Vos et al. (2005, p. 317) and Bloor & Wood (2006, p. 60) warn that "the accessibility of official documents is often a problem, owing to legislation about the confidentiality of information". De Vos et al. (2005, p. 319) further note that in some fields of study, "documents are simply not available because they have never been kept".

To ensure that my findings from document analysis were valid and reliable, I compared them to the data collected during interviews. Bailey (1994, p. 318) notes that "to ensure reliability, documents may be checked either by similar type of documents at two or more points in time"**.**

(d) Observations

Although observations were not originally meant to form part of my data collection techniques, they were included after I realised that it would be useful to refer to some key features I observed that supported my findings. For example, I took notes of three teachers that observed making use personal laptops at one of the schools where the school principal reported that teachers could not make use of computers. During interviews I paid special attention and took photographs to describe the setting and physical condition of the computer labs. I also took notes during focus group interviews to describe the body language of the participants, such as the way they sat, their facial expressions, etc. I typed up my notes after each session.

3.2.7 Transcription of Interview Proceedings

According to Bloor and Wood (2006, p. 166), qualitative research consistently involves making audio or video recordings of social interactions. The transcription of such proceedings is regarded as a crucial step, as there is the potential for massive data loss, distortion and reduction in complexity if the research is not made concrete (Cohen *et al.*,

2007, p. 365). Bloor and Wood (2006, p. 166) define transcription as “a technical typing procedure for representing spoken discourse in the text”. Bazeley (2007, p. 44) notes that transcribing involves translating from oral language, with its own set of rules, to a written language with another set of rules.

After the transcription of the data, transcripts were printed, sealed in envelopes and distributed to the respondents for verification. Respondents were informed that they should check whether what was captured was a true reflection of what they meant to say. Respondents were given a maximum of two days to verify the data, after which the researcher collected the transcripts from them. With the exception of one focus group, all of the respondents verified the transcripts and indicated that they were satisfied with their content.

3.2.8 Data Analysis

Cohen et al. (2008, p. 183) define data analysis as organising, accounting for and explaining collected data. Since I was investigating the perceptions and experiences of people, my mode of inference was inductive, moving from specific observations to broader generalisations. Ary et al. (2006, p. 454), Stake (1995, p. 71) and Cohen et al. (2008, p. 184) explain that in most qualitative studies, data collection and data analysis take place simultaneously.

The first step in my data analysis was transcribing the interview recordings. I read the transcriptions and my interview notes repeatedly, in order to gain familiarity with them. The second step, labelled categorical aggregation, involved my looking for repetitions in the data, in anticipation that issue-relevant meanings would emerge (Stake, 1995, p. 74). The third step, direct interpretation, involved looking at each single instance and attempting to draw meaning from it without looking for repetitions. This entailed pulling the data apart and reassembling it in a more meaningful structure (Stake, 1995, p. 75). The fourth step involved establishing patterns and creating categories, and then looking for correspondence between two or more categories so that their number could be reduced as far as possible (Stake, 1995, p. 78). The final step involved developing naturalistic generalisations about the analysed data.

3.2.9 Ethical Considerations

The researcher was aware of the ethical considerations that arise when one conducts research that includes participants. Johnson and Christensen (2004, p. 96) define research ethics as a set of guidelines that assist researchers to conduct ethical research.

To ensure that ethical issues were taken into account, first and foremost I wrote letters seeking permission to conduct my research to the Regional Education Officer and to the principals of the schools involved. Once permission was granted, a meeting with the selected principals was arranged. In that meeting, a letter seeking permission to conduct the research at the school was given to the school principals. The letter indicated that data would be collected from one-on-one interviews and focus group interviews of a minimum of three and not more than four participants, who use computers in their teaching and for administrative purposes. The letter also indicated that documents such as the school's ICT policy, ICT vision, and minutes of meetings where ICT was discussed would be collected and analysed.

In the same meeting, principals were informed that consent would be sought from the participants, and that they would be given information about the purpose of the study before they agreed to be interviewed. In this way, participants had the freedom to make an informed decision about whether or not to participate in the study. In addition, I indicated that to protect the identity of the participants and schools, pseudonyms would be employed in the study.

During interviews, participants were asked not to use their real names, and when they did use somebody's real name, it was omitted from the transcriptions. Participants were also assured that the research was unlikely to negatively influence the relationship between teachers and principals at the school, because the interest of the research was simply to understand the supporting role played by principals in ensuring effective computer use. Moreover, participants were assured that all the information they provided would remain confidential.

3.2.10 Limitations

The study had two limitations. Firstly, the four schools were purposefully selected, and therefore might not represent Namibian schools on the whole. Furthermore, four is too small a sample size to be statistically representative of all secondary schools in Namibia, and so my research findings cannot be generalised to the larger population. However, I believe that readers will be able to relate the findings of the study to their own contexts.

The second limitation of the study relates to the researcher's bias. Having been a teacher for so many years, I might possess certain values that affected the ways in which I gathered and interpreted my data. Ary et al. (2006) suggest that, to overcome this bias, the researcher needs to make use of self-reflection. In an attempt to do this, I kept a research journal in which I recorded my daily program, frustrations, thoughts, feelings, concerns and problems. I feel that this exercise helped me to conduct my research as objectively as possible.

3.2.11 Conclusion

A multiple case study was selected to investigate the role of school principals in promoting and managing computer usage in four schools. The study was conducted through semi-structured interviews. Four school principals and four computer coordinator teachers were interviewed. Two focus group discussions of three teachers per group were also held with to explore their perceptions on the role of the school principal in promoting and managing the usage of computers.

The individual cases were analysed to establish an initial coding system. This was followed by cross cutting analysis to determine the pattern and themes that were related. I kept a research journal where I reflected on my weakness, steps taken and difficulties experienced to minimise subjectivity. Validity was attended to trough triangulation, monitoring of bias and member checking.

In the next chapter, I present my research findings.

Chapter Four

Presentation of the research findings

4.1 Introduction

In this chapter I present the findings of the research, the aim of which was to investigate the role of the school principal in supporting the effective use and management of computers in schools. The questions in the interview schedule were posed in order to allow school principals to share their experiences of promoting computers in their school, and teachers to share their expectations and experiences of the school principal's effectiveness in this role. The interviews revealed other factors that lay outside the realm of the school, which led me to involve an MOE official in the Ministerial ICT Steering Committee in my research. I begin by presenting issues relating to schools (Section 4.2) followed by issues relating to the Ministry (Section 4.3). I arrange the issues under the following headings: acquisition, vision, usage, access, teacher's confidence and competence, maintenance, and challenges.

I give an overview of the four schools involved in this study and describe their main features. Data are presented in two ways, using the respondent's own words and as they appear in documents analysed. I present findings from each school separately. School principals interviewed are identified as school principal and computer co-ordinator teachers as CCT. Participants from focus groups are identified with psydonames. These are: Mutete, Ndobe and Nasilimwe at Samusisi S.S, and Mesho, Sifu and Silume at Chwanga S. S. School.

4.2 Case studies at schools

4.2.1 Samusisi Senior Secondary School

Samusisi Senior Secondary School was the first school site where I collected data. It is a rural school offering Grades 8-12. Gaining access to the school was straightforward as a colleague at NIED introduced me to the school principal before my visit to the school. The school has a

total of twenty computers located in the computer lab and one computer in the School Secretary's office. Apart from Samusisi, another primary school running from Grades 1-7 is located within a radius of 800 meters. A pro-active school principal, who has been at the school for more than three years, manages the school. The Mathematics teacher is responsible for running the computer lab. The picture below depicts the computer lab.

Figure 2: Computer lab at Samusisi

The other members of the school in the focus group were Mutete who was new at the school, Mbufu who teaches Physical Science and Ndombe who teaches Agriculture. My first meeting with the school principal served as an information session where I described my research aims.. We agreed that I should give her time to discuss the matter with the teachers. During my second visit, I spoke to the staff members about my research and I was asked to address the teachers on the importance of ICT in education. In addition, I was asked to encourage them to complete the ICDL. It was only during my third visit to the school that I interviewed the School principal and the computer coordinator teacher (CCT). The focus group discussions could not be done that day as we had run out of time. However, a consensus was reached that I should return to the school a week later. The following issues arose from the interviews with the school principal, CCT and the focus group discussions.

(a) Acquisition of computers

My interview with the school principal revealed that the school acquired its computers through the Ministry deployment of computers. CCT and educators confirmed this in the

focus group discussion. My question on the role of the school principal in the acquisition of computers revealed that the school principal took the initiative of contacting the officers responsible for the deployment of computers at national level and followed up with phone calls to the office. The principal indicated that:

> After learning about the computers to be deployed through ETSIP, I followed up with NIED, a questionnaire was sent to us, I filled it in, after filling up the questionnaire a group of people from TECH/NA came, they assessed our room to see whether our room had burglar-proof windows as well as a burglar-proof door. Fortunately enough we qualified, and then in 2007-2008 we were supplied with computers.

This notion was supported by the CCT who said:

> The school principal learnt about the deployment of computers at a certain workshop and when she returned to the school, teachers were informed and she began inquiring about how the school could acquire more computers.

Contributing to this, Mutete noted that:

> Although I am new at this school, I was informed the acquisition was made through the efforts of the school principal who applied to TECH/NA. None of the teachers was involved.

(b) Vision of the school

On my first visit to the school, I noticed a vision statement for technology on the notice board of the school principal. When I asked the school principal about the vision for ICT for the school on the day of the interview, she responded:

> The vision of our school with regard to ICT is to be a computer literate school as well as community in order for us to meet Vision 2030.

The data suggest that there was a consensus among participants that the school had a vision for ICT. My interest was on what role the school principal played in the realisation of the vision. The school principal saw her role within the vision as that of learning together with her teachers so that they are encouraged to become computer literate. However, the CCT perceived the role of the school principal in the vision as that of encouraging learners and teachers to participate in ICT learning in order to meet the vision. Mutete and Mbufu shared this sentiment in the focus group discussions.

(c) Access to the computers

Data suggest that teachers, learners and the secretary had access to the computers. Both the computer coordinator teacher and the focus group educators confirmed that access to the computers was controlled by the computer teacher in consultation with the members of the school management team (senior teacher, head of department, and school principal). Teacher access to the computer lab depended on what free time the teacher had during the day. However, the computer lab was available to teachers and learners in the evenings from 19h00 to 21h00. Sometimes the computer coordinator would open from 18h00 hours to 22h00 hours. The review of the ICT user policy for the school suggested that learners had access to the computers for thirty minutes in the afternoons from Monday to Friday. Both educators and the school principal identified a lack of time as one of the factors inhibiting access for teachers. Ndombe from the focus group noted that:

> We are very free to use these computers, however the only issue that I would say hiders us from using these computers is that we don't have time. You have to teach from 7h00-13h00 and break for lunch, return to school at 15h00 and start teaching again up to 16h30. You don't real get that ample time you need with the computer. However, the computers are available in the evenings.

Teachers who had free periods and wanted to use the computer lab would approach the CCT to entrust them with the keys for the computer lab. Access for learners fell into three areas: ICT literacy during normal teaching periods, Basic Information Science and Life Skills; Specific ICT literacy given to learners that paid N$10.00 to be trained in a particular module. Learners, who did not pay the required amount were excluded from receiving this training but had access to the computers during the normal teaching time of Basic Information Science and Life skills. The CCT indicated that:

> We have decided that those people who have to use the computers, they must pay a certain fee for example the learners they have to pay N$10.00 for registering for a certain module, like they are doing module 2 so they need to pay just N$10.00 for them to be taking part in the computer training, for teachers it is N$20.00. Those who don't pay are excluded from this training, but still have access to the computers without the help of the trainer.

There was however, common understanding that this practice discriminates against learners

and denies those excluded from getting the skills that will help them to contribute towards the attainment of Vision 2030. Both the school principal, CCT and educators from the focus group pointed out that the issue of a N$10.00 payment for learners to access computers was discussed in the parents meeting and an agreement was reached that by 2010, the payment would be made part of the SDF so no learners would be excluded.

Educators in the focus group agreed that they needed to contact the CCT teacher whenever they wanted to use the computers, even if he was teaching, and the CCT entrusted the teacher with the lab keys. However, the teachers agreed that due to the limited number of computers available, they were often unable to use them. This problem was sometimes resolved by asking learners to forgo their time in order for the teacher to complete his or her task.

In order to address the problem, I asked the educators for suggestions to improve access to the computers. Mutete suggested the compilation of a user register, where each user would sign in to use the computers for an hour. Once their time had expired, they would be asked to leave the computer and make way for the next person. She noted that this arrangement would ensure equal access for each member.

(d) Usage of computers

As indicated, the computers were accessible to teachers, learners, and the school secretary. However, the school secretary used the computer located in her office most of the time and seldom made use of the computers in the computer lab. My interviews with the school principal made this clear. The school principal indicated, “We bought the secretary’s computer from SDF after the school received the computers from TECH/NA as she used to use the type writer before”. There was consensus among the teachers I interviewed that the teachers used the computers for preparing tests to be written by learners and for doing mark sheets. Mbufu indicated that the school’s plan was to first instil confidence in the use of computers by teachers, thereafter they would progress to using the computers for preparing and presenting their teaching.

The computer coordinator indicated that some of the teachers used the Encarta software

installed in his laptop to supplement their teaching materials. This laptop was given to the teacher after completing the ICDL. However, data suggest that although the laptop was provided for his use it was not his property. Should he transfer or get a promotional post at another school, he will have to leave the laptop behind. Both educators from the focus group and the computer coordinator commented that if they had internet connectivity, they would be using the computers for searching for additional teaching and learning materials to supplement their textbooks. However, Mbufu noted that the issue of time impedes teachers and learners from using computers

Figure 3: Pictures of teachers and learners using computers at Samusisi

The CCT and educators in the focus group commented that they sometimes had no time to use the computer lab as they were involved in many things. For example, the CCT noted that "I am a CCT running the computer lab, I am the Mathematics teacher, I organise the Science Fair and I am also a member of the technology committee. In support, Ndombe commented, "on top of that I have to teach in the afternoon, mark my learner's books, do my preparation, and supervise learners at the school".

The principal viewed her role in promoting the usage as that of encouraging teachers to make use of the computers during their spare time in the afternoons, evenings and where possible during weekends. She indicated that:

> I used to encourage my teachers to work very hard during their spare times in the afternoon and in the evening as well as weekends if possible.

To bring to light the role of the school principal in promoting the usage of computers, educators, the principal and CCT were asked *What is the role of the school principal in promoting the usage of computers?* Educators from the focus group indicated that the role of the school principal in promoting the usage is that of encouraging teachers and learners to use the computers. Mutete responded that:

> Like I said before, she is very supportive. Last year when we were doing the ICDL training some teachers had a negative attitude towards the training. But she tried her level best to encourage us saying that 'people are living in the world where technology is taking over, if we are left behind, then we are going nowhere, so we need to take advantage of this so that at the end of the day it benefits us both as individuals and in our teaching'.

Ndombe concurred with Mutete that the school principal's role is that of encouraging teachers to use computers and supporting them in completing the ICDL, they need to work hard to be certified as competent computer users. Mbufu emphasised the importance of the presence of the computer coordinator to monitor the usage. On the issue of N$10.00 paid Muteta suggested, "The school principal should ensure that all learners pay the required money to use the computer lab so that all learners have access to the computers".

(e) Monitoring of computer usage

Educators in the focus group and the school principal both concurred that the computer coordinator was responsible for monitoring the usage of computers in the lab. However, Mbufu saw the school principal as the overall supervisor. According to Mbufu "the school principal usually pops in like the way she checks in normal teaching and learning to see how learners are doing, ask questions on the cleanliness of the lab, and ask the computer teacher what problems hamper the use is the computers that should be attended to". Mbufu felt that although the school principal does move around checking how computers are used more still needs to be done. Ndombe suggested that:

> In future, the school principal should have a program that exactly checks and monitors the level of learning of both learners and teachers at which levels are learners like she normally does in the classrooms.

(f) Level of computer literacy for teachers

Data from the CCT and the School principal show that the school received an International Computer Driver Licence (ICDL) facilitated by the Ministry official with the deployment of computers for one month. Two of the teachers acquired the ICDL while four more acquired the certificate for the first four modules. After the facilitator from the Ministry left, the CCT that had obtained the ICDL and his assistant took over training learners and some of the teachers in basic computer literacy. Mutete had this to say on the issue of the literacy level of teachers, "only a few teachers had used computers before the ICDL training as such it was quite fun, some people did not know how to switch the computer on and off. However, things have improved since the training".

The CCT perceived the role of the school principal as that of encouraging teachers and learners to take part in the programs as the computers were brought to the school for that purpose. Furthermore, the CCT indicated, "the school principal encouraged teachers in meetings to take part in training".

The principal was asked what her role in ICDL training was; she noted that since it was an Ministerial initiative her role was limited to that of spurring the teachers on to take part in the training. Mbufu confirmed this: "the school principal tried her level best to encourage us; she would drive here even on Saturdays just to motivate us. She would say, "If I don't know how to use computers I am sitting for an exam, what about you".

(g) Maintenance of computers and technical support

The school had not experienced any problems that required the maintenance of computers since the installation of the lab. However, both the school principal and the CCT indicated that minor technical issues such as changing cartridges and trouble shooting was done by the CCT. Major problems were to be attended to by the NETSS centre as instructed by TECH/NA.

However, maintenance of the secretary's computer, which was acquired from the SDF, was

outsourced. The principal saw her role in the maintenance of computers that were acquired through the MOE's deployment as that of arranging for the transportation of the computer needing maintenance to the NETSS centre. This was confirmed by the CCT who noted, "I just inform the school principal who should arrange for the transportation of the computers".

(h) Challenges affecting the use of computers and recommendations

The adoption of computers into schools presents school principals and educators with numerous challenges. Having discussed the role of the school principals in supporting and promoting the use of computers at the school, educators were asked *What challenges do you face that could hamper their use*. The following issues emerged: lack of internet connectivity, security, air conditioning, teachers being overburdenned.

The lack of internet connectivity was the challenge that was mentioned most often that affects the use of computers at Samusisi Senior Secondary School. The CCT noted that:

> I will say the absence of the internet is a challenge because we are a rural school which means access to extra teaching materials is a problem; with internet connectivity you can easily send your learners to surf the net on that particular topic.

Both the school principal and the three educators from the focus group shared these sentiments. The school principal noted that:

> We are faced with a number of issues but the most pressing challenge is that of internet connectivity. Currently our teachers cannot go beyond computer literacy as they are limited to that.

My interest in this question focussed on what the school had done to address the challenge. The school had tried to contact Telecom and Rivergade to install network ports in the computer lab but had been unsuccessful.

Another concern that was raised was that of the security of the computers at the school. Mbufu made this concern clear in the focus group when he noted that:

> Although the MOE official who came to introduce the deployment of computers at our school touched on the issue of the security of computers, I think our computers are not safe as we only lock using padlocks.

Mutete commenting on the same issue recommended, “Schools should install alarm systems”.

The lack of air conditioning in the computer lab was the third most important challenge at Samusisi Senior Secondary School. Mutete, CCT and the school principal all indicated that the issue of air conditioning was pressing as the school was in a dusty area. Furthermore, the weather was very hot during summer and users were forced to open windows, which allowed dust to enter the computer lab. Data suggest that the school planned to buy an air conditioning unit in 2010 with money collected from the payment for usage of the computer lab.

The CCT and Mbufu recommended that the ministry should appoint teachers to oversee the running of the computer lab.

The snapshot below summarises the findings at Samusisi Senior Secondary School.

Indicator	
Vision	Documented ICT vision directed towards the national vision of 2030
Acquisition	Computers in the computer lab acquired through the MOE deployment, secretary’s computer bought from SDF after the deployment of the computers in the lab.
Hardware	20 system unit box, 1 projector, 1 server, 1 LaserJet printer, wireless access points.
Access	Access is open to teachers, learners and the school secretary. Learners who pay receive extra access by being trained on certain modules prepared by the CCT. The CCT is responsible for drafting the timetable.
Usage	Computers are used for computer literacy and typing administrative work of teachers, e.g. class tests for learners, entering marks.
User policy	Have developed computer lab rules.
Training	Teachers were trained for one month on ICDL, two of the teachers received certificates for completing all seven modules, while four received certificates for completing the first four modules. The CCT cascades computer literacy classes to teachers and learners.
Maintenance and technical support	Technical support of computers acquired through TECH/NA! is provided by NETSS centre. The school is responsible for maintenance of the computer purchased from SDF.

Table 1: Snapshot of technology at Samusisi Secondary School

4.2.2 Chwanga Senior Secondary School

Chwanga Senior Secondary School was the second school where I collected data. It is an urban school offering Grades 8-12. It is a day school so learners live at home. The school has two computer labs, one that was installed by Schoolnet almost five years ago, and the second one, which was received in May 2009 through the Ministry's deployment programme.

A single teacher manages the two computer labs. The assigned teacher keeps keys to the computer lab and spare keys are kept in the principal's office. Lab 1, which consists of five computers, used to have internet connectivity; while the second lab does not have internet connectivity. The CCT teacher also teaches Biology as a teaching subject. There has been a change of leadership at the school as the principal who was there when the computers were acquired retired and his replacement has been there for less than a year.

Figure 4: Computer lab at Chwanga

(a) Acquisition of computers

The computers were acquired in three different ways at Chwanga. Schoolnet established the first computer lab while the second lab was acquired through the Ministry's deployment program. The computer in the administrative block was purchased from the school

development fund.

The role of the school principal in the acquisition of these computers is unknown as the school principal has recently retired and the present CCT was not involved in the process. The CCT reported that the ex-principal informed him that the school would receive the computers from the Ministry of Education. The current school principal noted that,

> Although I cannot answer on his behalf, the role of the school principal in the acquisition of the computers was limited. The first set from Schoolnet as far as I can remember was an initiative of the Ministry to deploy the computers at schools that served as cluster centres. With the second deployment, it is the Ministry's project to equip every school with computers.

My interview with the MOE official (see Section 4.3.2.1) revealed that the role of the school principal in the acquisition of computers that are deployed by the Ministry involves completing a questionnaire asking about the readiness of the school and ensuring that security measures such as burglar-guarded windows and doors were installed. The principal's role according to the MOE official is to complete the questionnaire and return it to the responsible office running the project.

My experience as a Computer Coordinator at the time when SchoolNet was deploying computers to schools reveals that school principals had no role in the deployment as the program targeted schools that were cluster centres.

(b) Vision of the school

There were contradictions regarding the ICT vision of the school. Sikulume in the focus group indicated that although he has been at the school for two months he was not aware of any established ICT vision for the school. In contrast, Mesho from the focus group who has been at the school for many years gave two visions of the school. That is:

> Our vision is to see that in five years time all our teachers and learners are computer literate.
>
> To have all computers connected to internet, so that teachers use electronic dictionaries and other sources.

The school principal indicated that:

> Our vision is to have almost all of our teachers computer literate by 2010.

The role of the school principal in the realisation of the vision also produced different views. While the principal saw his role within the vision as that of making sure that the vision is attained, the CCT perceived the role of the school principal as ensuring that everybody has access to the computers. Mesho from the focus group, on the other hand, saw the role of the school principal as that of liaising with other stakeholders to purchase more computers and communicate the vision to the teachers and learners.

(c) Access to the computers

Data suggest that teachers and learners have access to the computers. The CCT noted that the school has a program for teachers where they attend training. However, the interview with the CCT revealed that learners paid N$20.00 per term for their training. With regard to the accessibility of computers, the study revealed that there are restrictions to the access of the learners. This was made clear by Nasilimwe who noted that “too much of anything becomes a problem in the long run. Hence, if you give learners too much access they become dependent on the computer and then they might end up misusing them. So accessibility is a bit restricted; so, the restrictions which are there are for management purposes”.

The data suggest that the CCT together with the management team are responsible for deciding on who should have access. Mesho and Sifu emphasised the importance of procedures within an organisation. Mesho commented that “procedures are very important in any organisation; you cannot run an organisation without procedures and policies”. In support, Sifu noted that “to access the computers you first have to seek permission from the teacher in charge as you cannot just walk in and use the computers”.

There was general agreement among the participants interviewed that the role of the school principal was to oversee that computers are used properly. Sikulume agreed that it was the principal’s role to check on the misuse of the computers, where evidence of misuse is present he could decide to ban the user. The school principal did not see his role as determining who

should have access. He perceived his role as that of encouraging his colleagues (teachers) in the use of the computers and joining the program to become computer literate.

(d) Usage of computers

Data suggest that computers are used for computer literacy and searching for information. The CCT indicated that the computers were used for teaching computer literacy to learners and teachers. The other five computers that previously had internet connectivity were used for both teaching and research purposes. Educators in the focus group indicated that the computers in the computer lab were primarily used for teaching and research purposes. The computer for administrative use was located in the administration block. Mesho stressed “the computers you see here are for teaching purposes only. The administrative computer is in the staff room”.

According to the CCT, “teachers accessed the Encarta software. The computer lab deployed by Schoolnet was used for searching information on the internet while the internet service provider was still Schoolnet. Mesho confirmed this in the focus group.

The data suggest that most of the staff at the school were already self-motivated and use the computers on their own. However, the CCT noted, “we still try to encourage everyone”. He noted that the former school principal had been more involved in promoting the use of the computers.

(e) Monitoring of computer usage

Monitoring of the usage of the computer lab was done by the CCT. Both the school principal and the CCT confirmed this. The school principal reported that “the CCT is responsible for monitoring; even the teachers when they are going to go there, they will need the permission of the person responsible”. These sentiments were similar to those raised by Mesho in 2.3.2.4 who noted that procedures are very important in the organisation.

(f) Level of computer literacy for teachers

Data from this section reveal that there were differences in the levels of computer literacy of the teachers. Sifu and Silume all concurred that the ICT literacy level of teachers at the school was high as most of the teachers recently graduated from the college. However, Mesho who did her tertiary studies before computers were common at universities disputed that observation. Mesho argued, "Some of the teachers do not have basic computer literacy." However, the CCT confirmed that the literacy level of teachers at the school was high, as the school had received training facilitated by a woman from Japan.

The study revealed that the CCT was responsible for providing computer literacy training to teachers and learners. The training given to learners occurred during normal class hours in Basic Information Science lessons.

All participants raised the concern that ICT was too important to be in the hands of teachers who already had extra teaching responsibilities. As such, they had no time for training other teachers, as they are always busy with their teaching responsibilities. Silume recommended that the Ministry should appoint teachers to oversee ICT activities in schools.

(g) Maintenance of computers and technical support

Data suggest that Schoolnet and the NETSS Centre provided technical support of computers. However the CCT was still responsible for attending to minor technical problems. The CCT further revealed that Schoolnet no longer took responsibility for maintenance and technical support. The school had to outsource to technicians. For the new set of computers deployed through the Ministry's project, the NETSS centre handled technical problems. Where possible they would be given instructions telephonically on how to go about solving the problem. The study also found that the CCT did the buying and replacement of cartridges and other small accessories like mouse and keyboards. The school principal's role is to authorise funds for buying the accessories as required.

The principal explained that the school had established a fund that caters for all ICT

equipment (printers, photocopying machines, fax machines, telephone, and computers).

> We have a vote that caters for all equipment, these includes photocopying machines, computers, scanners etc.

The CCT and the school principal concurred that the principal's role in the maintenance of ICT equipment was to authorise funding to buy the equipment for replacement. The school principal saw his role in the maintenance of computers as that of overseeing that the computers work and of coordinating with other companies to make sure that computers are connected to internet.

(h) Challenges affecting the usage

The question on *What challenges hamper the use of computers at the school* yielded three responses. They are lack of internet connectivity, maintenance, and lack of infrastructure.
The lack of access to the internet was the biggest obstacle by far. Educators from the focus group discussions concurred that absence of internet limited their use of the computers. Mesho who had been at the school when the school still had internet connectivity shared her experiences. "When the school was connected to internet you could see teachers using the computers to surf the internet to get the extra information that they needed". Furthermore, teachers could read newspapers on the internet and be informed about current affairs. In addition, teachers used email to collaborate with each other.

Despite the advantages that Mesho raised, there was a general understanding among the Educators that internet connectivity presented its own challenges to schools. According to Mesho, the N$300.00, which schools had to pay to Schoolnet for internet connectivity, was too much for poor schools and her school could not afford to make regular payments, which led to their internet access being discontinued. Silume identified misuse as one of the challenges. On this issue, Sifu suggested that the school should use user names and passwords to control wrongful use.

Maintenance of computers was the second most mentioned challenge. The school principal commented that:

> Maintenance of computers is a problem most especially if we experience serious problems with breakdowns and malfunctions of the computers, you

> know computers are expensive to fix. In addition, I am not sure how well equipped the technicians are in Caprivi who can fix some of these problems.

The CCT also shared similar sentiments, “the problem we have is people to maintain our computers. Furthermore, technicians who install the labs just install and leave without giving proper guidelines on what you must do if there is a problem”.

Lack of infrastructure was the third challenge. This took the form of the number of computers and a lack of chairs. Mesho commented that access to computers was a problem, as the school did not have enough computers. In support, Sifu stressed that “if you want computers to influence teaching and learning, you cannot supply only 20 computers for a school with 500 learners. The current ratio is 50 learners and 2 teachers per computer. That is not enough; we are supposed to have computers in the staffroom to be used by teachers for typing question papers”.

The other concern raised was that of not having permanent chairs in the computer lab. Silume stressed that “as you can see here they are no chairs in the computer lab; each time a class comes here, they have to bring their own chairs.” Mesho’s contribution on this issue was that the Ministry should have built computer labs that take 40 or 50 participants.

The table below provides the summary of the state of technology at Chwanga

Indicator	
Vision	No documented vision
Acquisition	Computers in the computer lab acquired through the MOE deployment and Schoolnet. The secretary’s computer bought from SDF after the deployment of the computers in the lab.
Hardware	20 system unit box, 1 projector, 1 server, 1 LaserJet printer, wireless access points.
Access	Access is open to teachers and learners. The CCT is responsible for drafting the timetable.
Usage	Computers are used for computer literacy and typing administrative work of teachers, e.g. class tests for learners, entering marks.
User Policy	No policy
Training	Teachers were trained for one month on ICDL, two of the teachers received certificates for completing all seven modules, while four received certificates for completing the first four modules. The CCT cascades computer literacy classes to teachers and learners.

Maintenance and technical support	Technical support of computers acquired through TECH/NA! is provided by NETSS centre. The school is responsible for maintenance of the computer purchased from SDF.

Table 2: Snapshot of technology at Chwanga Secondary School

4.2.3 Kazizila Combined School

This school is a combined school running from Grades 1-10. It is a day school located in an urban area. The school was not part of my research site at the beginning of the project. The inclusion of the school became necessary when I was denied access to the senior secondary that offered Computer Studies as an examinable subject on the date we agreed upon to collect my data. After sharing the problem with one of the Advisory Teachers at the regional office, I was advised to consider including Kazizila in my study as the school had the facilities and the school principal was approachable. I included the school after familiarising myself with the ICT activities at the school. One of the reasons that I included this school is that it has a unique set up in which the school principal keeps the keys to the lab. The computer coordinator who oversees that the computers are in working condition does not have a set of keys. At the other three schools, the running of the computer lab was entrusted to one teacher. Here, the school principal is responsible for teaching Basic Information Science, which has a component on basic computer usage.

This school was the only one where the school principal had a computer in his office and where computers were installed in the computer lab. Figure 6 depicts the two sets of computers in the computer lab.

Figure 5: Computer lab at Kazizila Combined School

(a) Acquisition

Data suggest that the school acquired its computers in three ways. The first set of ten computers was acquired from the embassy of China through the National Council while the second set of twenty computers came via the Ministry's deployment program. The four computers used for administrative purposes were bought with funds from the school development fund. However, the CCT reported that the school principal took the initiative of writing a letter via the regional office requesting donations

(b) Vision

Data suggest that the school had just drafted the ICT vision, which was awaiting approval of the school board. According to the school principal, once approved, the school's ICT vision would incorporate ICT throughout the curriculum and encourage each teacher to make use of the computers in the computer lab. The CCT noted that it was the school principal's idea to develop the vision.

The school principal saw his role within the vision as ensuring that everyone from the teachers to the learners incorporates the vision.

(c) Access

Data suggest that teachers and learners had access to the computers which was confirmed by the School principal and the CCT. Teachers had access to two computers in the staff room; in addition to that, they had access to computers in the computer lab if they wanted to use them.

The study found that access to the computer lab had to be arranged with the school principal as he kept the keys to the computer lab. The reason why he kept the keys was made clear by the school principal. He noted, "I was given the responsibility of the computer lab when I first came to school by the staff members". He keeps the keys for the computer lab so he can monitor how many teachers use the computer lab.

(d) Usage

Computers in the computer lab were mostly used for teaching and learning, while computers in the staff room were mainly used for administrative purposes, typing of daily preparation and class tests. The researcher observed the use of the computer lab and computers in the staff room in two of his visits to the school. On the familiarisation visit to the school, the researcher found learners in the computer lab being taught by the teacher. Two teachers were observed planning their lessons on the computers in the staff room. Furthermore, the school principal used the computers for teaching Basic Information Science to learners. The CCT indicated "when learners go for BIS programmes, they are taught to be computer literate. They are given some basics on how to use computers independently so that they can access computers elsewhere over the weekend when the school is closed".

The study found that the school was in the process of connecting internet as the school had just discovered that it had a line for internet. The principal indicated that once connected teachers would be able to use computers for research and to supplement their teaching materials.

The principal noted that the specific teacher who requests the keys monitored usage of computers. Thereafter, the caretaker teacher who received troubleshooting training checks the lab to see that everything is in place.

With regard to promoting usage, the CCT noted that the role of the school principal was to ensure that all teachers became computer literate and incorporate ICT in their daily lives. The school principal saw his role as that of motivating the teachers to make use of computers. According to the principal, he encourages the teachers to use computers as he noticed they were not making sufficient use of the hardware.

(e) Teachers' confidence and competence

There were contradictions between the statements by the CCT and the School principal on the issue of the training of teachers. The CCT indicated that an official from the Namibian

Education Technology Association (NETA) trained the school and a few of the teachers were awarded computer literacy certificates. In contrast, the school principal noted that the ICT literacy of teachers was very low. However, my data search on the literature related to Namibia retrieved a document from the NETA reporting that the school had received training.

The CCT perceived the role of the school principal as that of the disseminator of information. In addition, CCT C indicated that it is the responsibility of the school principal to identify areas in which staff need training and request the Ministry to provide a facilitator or trainer for the workshop. Furthermore, CCT expected the school principal to request a teacher to be employed on a permanent basis to train teachers and learners on ICT. The principal perceived his role in the provision of training for staff as "encouraging teachers to enrol with other institutions particularly this ICDL, as now we have this training online. So we encourage all teachers to enrol as a school so that we use these facilities".

(f) Maintenance and Technical support

Data suggest that the school was responsible for maintaining the first set of computers, and approach the NETSS Centre for the second set. The study also revealed that the CCT was trained in troubleshooting when the school obtained the first set of computers. The CCT also mentioned that he was responsible for handling all minor issues, but where he could not solve the problem, the school outsourced the work.

The school principal reported that he had no role in maintenance and technical support. However, he perceived his role as that of authorising funds to replace accessories and cartridges. The CCT commented that he expected the school principal to establish a budget for the maintenance of computers.

(g) Challenges

The CCT indentified three challenges: lack of skills, internet connectivity, and educational software. The CCT recommended that the school principal should request a teacher to teach BIS and serve as the teacher trainer who coordinates ICT activities. In contrast, the school

principal identified the following challenges: teacher's lack of computer skills and maintenance of computers.

Table 3 provides a summary of technology at Kazizila.

Indicator	
Vision	Draft vision sent to the school board for approval
Acquisition	Computers in the computer lab acquired through the MOE deployment and National council
Hardware	10 system unit box, 1 projector, 1 server, 1 LaserJet printer, wireless access points.
Access	Access is open to teachers and learners.
Usage	Computers are used for computer literacy and typing administrative work of teachers, e.g. class tests for learners, entering marks. Researching on Encarta
User policy	No policy and no rules
Training	Teachers were trained by NETA
Maintenance and technical support	Technical support of computers acquired through TECH/NA! is provided by NETSS centre. The school is responsible for maintenance of the computer purchased from SDF and national council.

Table 3: Snapshot of technology at Kazizila Combined School

4.2.4 Makukuni Senior Secondary School

Makukuni is an urban school offering Grades 8-12. It is a combination of both day and hostel students with the majority of the learners residing in the school's hostels. The school has only one computer lab, which is more than five years old. The school had experienced two burglaries where a server and five computers were stolen. The school offers Computer Studies as a teaching subject in Grades 8-9. The teacher who runs the lab is employed on a one-year contract. The principal, who has been at the school for more than fifteen years, manages the school.

The school had eleven working computers. However, at the time of my visit the CCT indicated that he used his laptop to show his learners the applications as the eleven computers

could not work without the server. Figure 7 displays what type of facilities are in the computer lab.

Figure 6: computer lab at Makukuni Secondary School

(a) Acquisition

There was a lack of clarity on how the school acquired the computers. The CCT reported that the computers were intended for a school in Okahandja; when it was found that the school already had computers, the computers were redeployed to Makukuni. The principal, on the other hand, noted that a company in Windhoek donated the computers.

Although the CCT was not there when the computers were purchased, he said that the school principal had written a letter to request donations. This was later confirmed by the school principal who noted, “My role in the acquisition was that of writing letters to different institutions seeking donations”.

(b) Vision

They were also contradictions regarding the ICT vision of the school. The CCT indicated that the ICT vision of the school was to equip all learners with ICT literacy skills. In contrast, the school principal noted that the vision was “to have computers in our class, that we would use power point projectors”.

The CCT perceived the role of the school principal in the vision as that of monitoring and encouraging learners and teachers to achieve that vision. The school principal perceived his role as that of facilitating the acquisition of more computers.

(c) Access

Data suggest that teachers and learners who took Computer Studies and Accounting were allowed access to the computers. This was made clear by both the school principal and the CCT. According to the school principal "access to the computers is determined by the subjects that learners are taking", meaning that it is only those who take commerce subjects as part of their learning subjects. The CCT however, noted that the school policy was not in line with what the Ministry advocates. He commented, "It is important of course that all learners get basic computer literacy, each and every work today requires ICT skills. Furthermore if these kids make it to tertiary institutions, they would be required to submit typed assignments".

The school principal did not perceive it as his role to determine who has access to the computers. However, he noted, "a committee decides on who should take computers as a subject based on their skills depending on how they perform in a practical test". On the same matter, the CCT commented, "the school principal was supposed to decide but unfortunately he was not that kind of person". He further questioned as to whether the CCT was the right person to be encouraging people to have access to the computers as he has no authority and mandate to do so.

(d) Usage

Data suggest that only learners who studied Computer Studies and Accounting were allowed to use computers. Learners used computers for hands-on practice and searching for information on Encarta Software, which was installed on the computer. Few of the teachers who were computer literate were using computers to type class tests, time-tables etc.

The principal perceived his role in promoting the usage of computers as that of encouraging teachers and learners to make use of computers when they had time. The principal noted, "Unfortunately teachers were not doing so". In disagreement, the CCT noted that:

> Let me just be brave enough and say no. when I arrived at this school there was a problem, each and every individual was interested in this lab, but one person was very strict. Some people were even saying that he might be jealous. When this lab opened, it attracted learners; they were interested in

> doing computers as a subject, but later the big cats that are at the top discouraged them. They would say learners are no longer studying each time they are in the computer lab. This was a very big discouragement.

He further indicated that he expected the school principal to encourage the usage of computers at the morning assembly and in staff meetings.

Data suggest that the CCT was responsible for monitoring the usage of computers but there was no guiding policy in the school. This was made clear by the principal who commented, "Usage is monitored although we don't have a policy that guides us". The CCT stressed that since the school principal is the head of the institution he had the overall responsibility of monitoring the usage.

(e) Teachers' confidence and competence

The CCT and school principal concurred that the ICT literacy level of teachers at the school was very low. This was made very clear by the CCT. When asked *What is the level of the ICT literacy of teachers at this school?* The CCT responded that:

> That is an interesting question; we are facing a very big problem when it comes to teachers, most specially those teachers who happened to be at tertiary institutions when there were no computers are facing a big problem. What they do is give the work to the secretary to type for them.

Data suggest that teachers had received training on basic computer literacy. The school principal raised this when he noted, "The computer literacy of our teachers is very low that is why they failed to get certificates when they were trained". The school principal saw his role as ensuring that teachers received training and encouraging teachers to take computer literacy classes. The CCT perceived the role of the school principal as that of collaborating with the Ministry to identify facilitators who would run workshops on ICT.

(f) Maintenance and technical support

Data suggest that the school is responsible for dealing with the maintenance of its computers. The CCT was responsible for attending to minor technical issues and for replacing cartridges. The CCT however noted that issues such as buying of cartridges was the responsibility of the

school principal. His role was to inform the school principal when he needed supplies. The school principal had the responsibility of calling a technician to fix the computers. The principal confirmed this. According to the principal, his role was to make sure that "computers are repaired".

(g) Challenges faced at Makukuni

The school principal and the CCT concurred that theft was the biggest challenge facing the school. In a low voice, the school principal mentioned, "our server, the main heart of our computers was stolen and up to now it has never been recovered". In addition, five computers were stolen and have not yet been returned to the school despite being recovered by the police as they are being used as evidence against the perpetrators.

I was interested to uncover what safety mechanisms the school had employed before the burglary and what mechanisms they had since put in place. Data suggest that the school had installed burglar bars and a burglar-proof door. Furthermore, the school hired guards from one of the security companies. The CCT noted that the school had shifted from using padlocks to rim locks mounted to the internal surface of the door. However, despite these precautions, burglars broke in for the second time by breaking the burglar bars on the window. As a counter measure, the school principal indicated that he was planning to install an alarm system in the computer lab. My interview with the CCT suggests that the school principal took an active role in reporting the case to the police and following up on their progress.

Another problem raised by the school principal was that of air conditioning the computer lab. He noted, "The rooms are too hot during summer which affects our computers and also affects learners using the computers". On his part, the CCT identified the usage of external storage devices such as memory sticks as a challenge. Table 4 below provides a summary of technology at Makukuni Secondary school

Indicator	
Vision	No documented vision

Acquisition	Through private companies
Hardware	11 work stations, and LaserJet printer.
Access	Access is open to teachers and learners doing commerce subjects.
Usage	Computers are used for computer literacy and typing administrative work of teachers, e.g. class tests for learners, entering marks.
User Policy	A set of rules of developed by the CCT
Training	Teachers received training facilitated by a volunteer but no certificates were awarded.
Maintenance and technical support	The school is responsible for maintenance and outsource to local companies for technical support.

Table 4: Snapshot of technology at Makukuni Secondary School

4.3 Issues from the Ministry

My investigations at the four schools presented in the previous section revealed that three of the schools acquired their computers through the Ministry's deployment program. Furthermore, the findings revealed that at Samusisi Senior Secondary School teachers received training on ICDL facilitated by the Ministry at the time of the deployment of computers at the school. These findings led me to investigate the ICT developments taking place at the Ministry. My investigations included interviews with one official from the MOE stationed at NIED who is a member of the ICT Steering Committee and the review of the Ministry's national ICT policy and implementation plan.

This section presents two topics that emerged from the findings:

- Issues to do with the decision for ICT deployment to schools.
- Issues associated with ICT implementation.

4.3.1 Issues associated with the decision for ICT deployment

Literature on ICT in education stresses three main reasons for the introduction of computers in schools. The first reason is the social rationale, followed by the vocational rationale, then the pedagogical rationale. My review of national documents suggest that the move to adopt ICT in schools was a response to the call of the national vision (Vision 2030) which aims to

improve the quality of life of the Namibian people to bring them in line with developed countries (Namibia, 2004). Furthermore, the vision aims to transform Namibia into a health and food secured nation where preventable, and parasitic diseases are under control, and where people enjoy a high standard of living. This first rationale is also related to responding to the radical changes in the market, and growing demand for ICT literate teachers who can effectively prepare school leavers for the globalised world.

The second rationale (vocational) considers the necessity for a society to have skilled technological workers and relates learning to future job and careers. This is followed by the pedagogical rationale, which emphasises the role of ICT in improving and enhancing teaching and learning. My review of the *ICT policy for Education* revealed the value of ICT as a tool to provide new opportunities for teaching such as:

- Offering the opportunity for more student-centred learning.
- Giving at risk students greater opportunities.
- Greater exposure for learners to vocational and workforce skills for students.
- Greater opportunities for multiple technologies delivered by teachers.
- Preparing learners and students for the real world.

I have presented the reasons behind the deployment of ICTs as identified by the national and ICT Educational policy. Next, I discuss issues to do with the deployment of computers in schools.

4.3.2 Issues to do with implementation

Literature on ICT development stresses that a well-planned and responsive education system provides an appropriate enabling environment for successful implementation of ICT in education policy and programmes (UNESCO, 2004, p. 25). My interview with the MOE official and a review of documents reveal that an ICT Steering Committee was formed. It included representatives from different directories of the Ministry of Education, tertiary institutions (UNAM, Polytechnic of Namibia), NGOs donor representatives, and volunteer organisations (*ICT policy for Education*, 2005, pp. 23-24). The primary role was to provide an overall vision, planning, coordination, overview of all ICT projects and activities

supporting basic education within Namibia (*ICT Policy for Education*, 2005, p. 25).

As mentioned in Chapter Two, the ICT Steering Committee developed an ICT implementation plan that outlines a schedule of all specific activities to be undertaken with a comprehensive time line and identification of responsible and supporting organisations. Furthermore, the implementation plan provides the narratives as well as context of all activities outlined in the operating schedule.

My review of the implementation plan identified the following sector wide components: (1) infrastructure readiness and deployment (2) curricular development (3) content availability (4) training and usage (5) educational management (6) maintenance and technical support, and (7) monitoring evaluation. However, my interest was in three of the seven issues. They are:

- Infrastructure readiness and deployment,
- Training and usage availability, and
- Maintenance and technical support.

4.3.2.1 Infrastructure readiness and deployment

My review of the implementation plan guide revealed that during phase one of the implementation (2006-2009), ICTs would be deployed at Secondary schools according to the rankings established through the Ministry's school selection criteria and e-readiness survey conducted prior to the deployment (Namibia. MOE, 2006, p. 35). The deployment is based on a pro-poor approach (MOE Official, August 3, 2009).

My interview with the MOE official revealed that school principals were requested to complete an e-readiness survey, which was circulated to determine the status of all the schools in terms of their ICT infrastructure. This covered the issues of the space available that could be utilised for the computer lab and the nature of the space available. Were there security bars at the door as well as on the windows? Then there were issues of electricity and telephone lines. My interview with the same official revealed that schools that had no

electricity would get support in terms of providing the necessary infrastructure.

Since my interest is on the role of the school principal in this process, I asked the official what was expected from the school principal. According to the MOE official, “the school principal is the overall overseer of all resources that are available at their schools. One of the key functions of the school principal is to ensure that there is a provision of resources for schools and hostels”. These resources imply human, physical, financial and resources that are related to the running of the school. The official stressed that school principals were informed that they were expected to manage and safeguard the resources.

4.3.2.2 Training and usage availability

Literature on successful ICT integration suggests that investment in professional development and the raising of teacher qualifications is an important means of ensuring high quality teaching (Ferguson, 1991). My interviews with the MOE official and review of the *ICT Policy for Education* and implementation plan suggest three types of training that was to offered to teachers and school principals. ICT literacy was to be addressed through the development and delivery of appropriate ICT literacy certificate training levels (Foundation, Intermediate and Advanced). My interview with the MOE official revealed that this training was being offered by an NGO. This would be followed by the ICT integration facilitated by Ministry employees as the NGOs lacked the pedagogical knowledge. Computer Studies was to be offered in Grades 8-12 as an examinable subject in schools with the appropriate infrastructure by 2007.

Research suggests that the teachers’ willingness to use computers is influenced by the availability of professional development opportunities and on-site help. The study found that the form of training given to teachers would be on-site. All teachers will receive the training for the Foundation level ICT literacy certificate and ICT integration. Furthermore, two teachers per school will progress to training on the Intermediate ICT level and two more teachers would receive training on first technical support. The MOE official emphasised that teachers trained on technical support would enable schools to attend to minor technical problems.

To enable school principals to gain the understanding, knowledge, and skills that are required for them to utilise ICTs in their schools, and as custodians of their schools, principals would be trained together with the teachers. Furthermore, school principals would receive training on education management, which is emphasised in the ICT policy for education.

4.3.2.3 Maintenance and Technical Support

Data suggest that three levels of maintenance and technical support for ICTs will be offered to schools. The first level will be that offered by the two teachers trained to provide first level troubleshooting for the ICT deployments. The schools would be provided with a detailed module for facilitating first level support. The second level support will be in the form of a national help desk, which will handle issues that cannot be resolved through the first level, on-site trouble shooting. The MOE official stressed that the help desk will have the ability to assist via remote access. Data suggest that the third level of support will be provided through the regional support facilities where technicians experienced in relevant platforms as well as network connectivity will assist educational institutions.

4.4 Conclusion

This chapter presented the findings on the role of school principals in supporting and ensuring effective use of computers in schools.

In the next chapter, I discuss the findings of the research in relation to the literature I read that is relevant to my topic.

Chapter 5

Discussions of findings

5.1 Introduction

In Chapter Four I presented the findings from the investigations at the four schools. The findings illustrated issues associated with the role of school principals in managing, promoting, and monitoring the use of computers. Themes that emerged from the data as presented in the preceding chapter provide the basis for this chapter where I discuss the supporting roles of the school principals. This chapter therefore narrates the outcomes of the study in the light of the literature. Three themes that surfaced from this case study are guidelines for school principals on ICT, the school principal as a transformational leader, and support within the school.

5.2 Guidelines on ICT role of school principals

This section explores issues related to the research question concerning the guidelines directing school principals in promoting the usage of computers in school. The section reconciles the perceptions of the school principals, teachers, and an MOE official with that suggested by the guidelines. The study established that there are no guidelines for school principals on their roles in relation to ICT. However, my interviews with the MOE official revealed that although not specifically mentioned, *the Guidelines for School Principals* and *School Indicators of Performance Standards* published by the Directorate of Programmes and Quality Assurance (PQA) imbed several issues that are related to the management of computers. The *Guidelines for School Principals* identify several issues such as acquisition of materials, maintenance of equipment, supervision, and monitoring of learning. These issues are all related to ICTs. These guidelines on how school principals manage state properties and resources are discussed below.

The Guidelines for School Principals emphasise that the school principals are the overall overseers of all resources that are available at their disposal. As overall overseers of all resources, school principals are appointed to ensure that the school is effective, efficient, and equitable. In performing their role, school principals are responsible and accountable for all equipment, materials, and supplies in their schools (Namibia. MOE, 2005, p. 172). Computers and other peripheral devices such as scanners, printers, LCD projectors etc, are among those resources. Furthermore, the school principal is expected to ensure that equipment is acquired in good time and that it is safely stored, controlled, and used efficiently and economically. Moreover, the MOE expects the school principal to perform the following functions, which are related to ICT.

- Plan, evaluate and support the work of subject groups and other groups of staff, delegate appropriately and clearly and evaluate outcomes to ensure quality education.
- Give proper instructions and guidelines for timetabling.
- Monitor the quality of teaching and learners' achievements including the analysis of performance data.
- Create a positive culture that promotes the quality of teaching and learning.
- Develop and implement guidelines for learner conduct, and a discipline plan with rules and consequences for the behaviour.
- Encourage collaborative decision-making.
- Coordinate and provide opportunities for staff development of teachers.
- Make regular inspections of the school to ensure that the school premises and equipment is being used properly and that good discipline is being maintained.
- Establish, in collaboration with the School Board, priorities of expenditure from the School Development Fund and monitor the effectiveness of spending.

My interviews with an MOE official revealed that school principals have been informed of their responsibilities and functions. An official I interviewed from NIED confirmed that the Directorate of Programme and Quality Assurance have trained school principals on their functions and responsibilities. According to the MOE official, one of the key functions that school principals received training on was ensuring that there is provision of resources for school and hostels. These resources imply human resources, physical resources, financial resources and resources that are relative to the running of the school and hostel. Apart from

the training, school, principals are informed of their responsibilities and functions in their letter of appointment.

In Chapter Two I presented an argument that ICT leadership and management roles of school principals are intertwined. Views of the respondents and documents analysed pinpoints that school principals perform both leadership and management roles. During interviews, some respondents (teachers) indicated that they expected the school principals to take an active role in acquiring more computers and encouraging teachers. This finding correlates with the understanding of Pont et al., (2008, p. 18) who note that the two roles are intertwined.

My argument is that school principals are expected to perform leadership and management roles in promoting the usage of computers. However, their involvement in promoting the usage depends on the leadership approach that they take when they install computers at the school, and the kind of teacher employed at the school. Data from Chapter Four suggest that the role school principals performed in promoting usage differed from school to school depending on the leadership approach of the school principal. At some schools (Samusisi and Kazizila), school principals took active roles in promoting the usage of computers by encouraging teachers and learners to make use of computers, while at Makukuni the school principal did not take an active role in the promotion of computer usage. The findings at Makukuni were not hopeful for the attainment of Namibia's Vision 2030, which aims to transform Namibia into a knowledge-based society.

Data from interviews suggest that school principals performed the following leadership functions: vision building, encouraging and motivating staff, instigating change, and capacity building of staff. In addition to leadership functions, data suggest that they also performed management functions. These include: seeking out donations, putting safety mechanisms in place such as burglar bars on windows and doors, monitoring the usage and seeing that equipment is serviced. However, the extent to which they performed these functions differed from school to school.

Data presented in Chapter Four suggest that there were differences in what school principals perceived as their role in promoting computer usage and on what teachers perceived as the school principal's role. Principals viewed their role as a leading learner, supervisor,

encourager, authoriser, and coordinator. However, their views on their roles differed from school to school. For example, the school principal for Samusisi viewed her role as that of a leading learner, encourager, coordinator, and authoriser, while the school principal for Makukuni saw his role as that of coordinator. Teachers perceived the role of the school principal in promotion of computer usage as that of resource provider, encourager, supervisor monitor, coordinator, and provider of security. The findings of this study echo an earlier study carried out by Akbaba that investigated the roles of principals in integrating technology in elementary schools in Turkey (see Chapter Two). Figure 7 summarises how each of the two groups (school principals & teachers) interviewed in the current study perceived the role of the school principal in promoting usage. The roles appearing in the intersection of the text boxes are those that are common to the two groups (teachers and school principals).

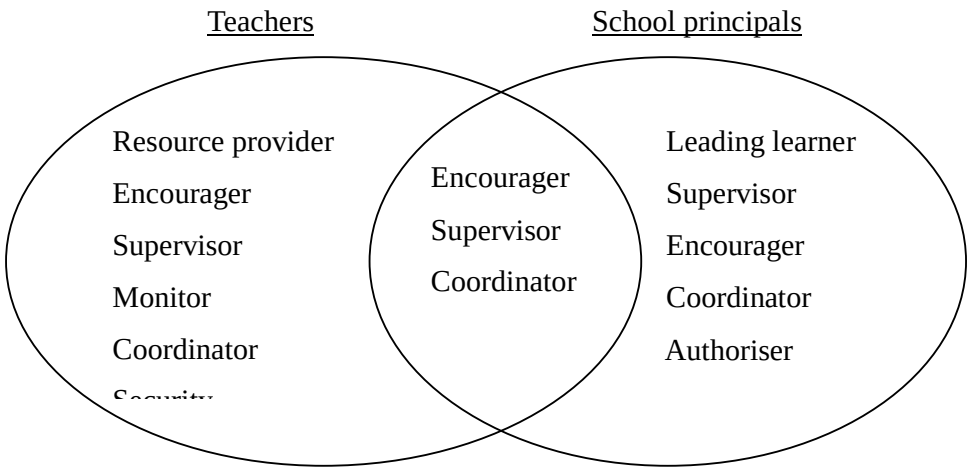

Figure 7: Role of school principals in promoting the usage of computers

An interesting finding from the study was the difference in perception of what school principals and teachers perceived as the role of the school principal in promoting computer usage. The principals did not view monitoring as part of their role but instead gave credit to computer coordinator teachers. In contrast, teachers perceived the role of the school principal as that of encouraging teachers to use computers, supervision, and monitoring of the usage. At some schools (Chwanga and Makukuni), school principals were not involved in the

process of monitoring the use of computers in their schools.

Teachers interviewed stressed that the school principal, as the overseer, should be responsible for monitoring the usage of computers. This notion correlates with the views of the MOE official who comments that “usually school principals are the overseers; they are the custodians of all the resources that are available at their disposal”. I now move to interpret the roles played by the principals through the literature and the guiding documents.

5.2.1 Management of ICT infrastructure

Several management functions contribute to the successful implementation of ICTs in schools. Leithwood (1994) argues that “even school administrators who employ the most transformational leadership practices appear to be, at the most overt level, consumed with managerial functions”. These managerial functions include facilities management, scheduling, resource acquisition, and resource allocation. Young (2007, p. 30) writes that “managerial functions cannot be overlooked at the expense of more visionary leadership ideals or functions”. In discussing these functions, I begin by discussing the role of school principals in the acquisition of computers and other related devices.

5.2.1.1 Role of school principal in the acquisition of computers

As mentioned in Chapter Two, section two, the school principal should play the role of the resource developer and resource distributor. Furthermore, they should develop and utilise scarce resources from outside and allocate the resources to support effective internal tasks. Data in Chapter Five suggest that school principals play a key role in ensuring that schools have resources. At Samusisi, Kazizila and Makukuni participants reported that school principals took an active role in the acquisition of computers. At Samusisi for example, the school principal took the initiative of contacting the ministerial office responsible for facilitating the deployment of computers to schools. At Kazizila and Makukuni, the participants reported that the school principals wrote letters seeking donations. Furthermore, in all four schools CCTs reported that the school principals supported them in acquiring

replacement parts for maintaining computers. This finding suggests that school principals performed their role of resource provider as suggested in the guidelines for school principals and their job descriptions.

Literature on the role of the school principal in the acquisition of equipment has stressed that the school principal plays a key role in identifying the needs of the school and devising a strategy on how to acquire the identified needs. Flanagan and Jacobsen (2003, p. 139) write, "Resourceful principals explore many avenues for acquiring technology resources, including fundraising, government and university grants, and business partnerships". Data presented in Chapter Four indicate that the school principal for Samusisi, who I regard as pro-active, played that role in acquiring computers for the school. Other principals that took active roles in the acquisition of computers are the former school principal for Kazizila and Makukuni. The findings suggest that the three school principals are able to innovate in addressing the needs of their teachers. There is a correlation with the literature that recommends that the school principal be a resource provider and with their job description in the *Guidelines for School Principals.*

The *Guidelines for School Principals* stresses the importance of securing school equipment. In the present study, I found that there was space for locating the computers and other infrastructure and telephone lines were available. In order for schools to receive deployed computers, the principal had to complete the questionnaire describing what infrastructure was available and what security mechanisms were in place. My interview with the MOE official suggests the e-readiness requirement was a control mechanism, which ensured that computers were fully utilised and not simply packed in storage.

As mentioned in Chapter Two, security of computers is a thorny issue in schools. Security of computers was identified as a pre-requisite for ensuring that computers are fully utilised in schools therefore the necessary security measures had to be in place to ensure that their schools received the computers.

Another interesting issue emerging from the study were comments raised by the CCTs on the importance of ensuring the schools ICT infrastructure is secure. The job description of

school principals states that “school principals have overall responsibility for ensuring that state property is safe”. This comment corresponds to issues raised in Chapter Two by UNECSO (2002, p. 42), Becta (2004), and Bialoberzeska and Cohen (2005, pp. 88-99). However, most of the participants felt that the security was not good at their schools as they used padlocks and no alarm systems were installed on computer labs because of a shortage of funds. The importance of securing the computer labs with an alarm system was seen as important at the three schools (Samusisi, Kazizila & Makukuni) and their principals. Data collected at Makukuni, where they lost their server and five computers suggest having burglar bars and burglar-proof windows are not sufficient to prevent theft.

Literature reviewed in Chapter Two suggests that the effective use of computers in schools goes beyond their acquisition and security. It requires teachers and learners having access and the expertise to make full use of the computers. In view of this evidence, I move on to examine the issue of access to computers at the four schools in relation to *Guidelines for School Principals.*

5.2.1.2 Role of school principals in determining access

Literature suggests that school principals should play a significant role in diffusing political conflicts and struggles for resources among members. As indicated in Chapter Two, lack of resources is among the factors that affect adoption of computers at schools. Respondents at all the four schools indicated that they had insufficient equipment (computers) which limited their hands-on practice. Participants emphasised the importance of ensuring that the school had peripheral devices such as digital cameras, LCD projectors, and scanners. This finding echoes previous studies (see Chapter Two) that indicated that access to hardware and software affects the integration of ICTs in schools (Ertmer, 2001; and Pelgrum & Law, 2003). The CCT and School principal from Makukuni acknowledged that they did not have many computers and their intention was to increase the number of computers by looking for donations, which will in turn increase the access and usage of computers at the school. However, I argue that with proper management such as timetable scheduling and forward planning and prioritising of equipment needs, schools could address many of these obstacles.

The findings on the practice of the four schools that have access to a computer lab leave a lot to be desired. Data presented in Chapter Four suggest that school principals played a minor role in determining who should have access to the computer lab, which led to computers being underutilised or a struggle for access. For example at Samusisi there was a lot interest in the use of computers by teachers and learners, but participant reported the problem of shortage of computers. This meant that learners had to forgo their use in order for teachers to have access. This conflict could have been resolved by the provision of a schedule for use. *Guidelines for School Principals* suggest that "school principals should give proper instructions and guidelines for timetabling and monitor the quality of teaching and learners' achievements including the analysis of performance data". This arrangement could free the computer lab for teachers at a given time. In reconciling the roles of the school principals with the guidelines one can easily see that school principals have failed to perform this role properly. I now examine the leadership role of school principals, which I identified earlier.

5.2.2. Leadership functions performed by school principals in promoting the usage of computers

I have presented an argument in Chapter Two and throughout this chapter that school principals perform both management and leadership roles. The following leadership functions were identified and presented: vision building, encouraging and motivating staff, instigating change, and capacity building of staff. My discussion in this sub-section is centred on these functions.

5.2.2.1 Vision building

One of the functions highlighted in the job description for school principals is that "the school principal in consultation with the school board and the staff is responsible for generating a vision, ethos, and policies for the school which promotes a high level of achievement". Literature suggests that for technology to be effective, its introduction should be accompanied by opportunities for staff, learners and parents to develop a common vision and shared purpose that includes, but is not limited to, the integration of technologies. Data presented in Chapter Four suggest that only Samusisi and Kazizila had established a vision

for ICT. The two school principals performed their role as stipulated in their job descriptions.

Another worrying practice is the lack of user policy that guides both learners and teachers on the usage of computers. The study found that although participants reported that the presence of computers presented schools with a number of challenges, only two of the four schools had computer lab rules. These rules covered issues of what was acceptable use and what was not acceptable. The absence of the user policies implied schools had no guidelines on safety measures of the computer lab, what type of infrastructure was available, where to go for technical support etc.

5.2.2.2 Motivation and monitoring of usage

Unfortunately, data suggest that technology is never used in teaching and learning in the classrooms. Computer basic skills such as word processing and typing of administrative work such as entering marks on work sheets are the most common usage of computers. However, there is available evidence that suggests that educators at Samusisi recognised the need of integrating ICTs into their teaching. This was made clear in Chapter Four by Mbufu.

Data presented in Chapter Four suggest that some school principals performed the role of ‘encourager’ to teachers to use computers and encourage CCTs to maintain the computers. This is made clear by the school principal of Chwanga who commented, “My role in the maintenance of computers is to encourage the teacher responsible to find a technician who should repair the computers”. In contrast, the principal for Makukuni was seen as an obstacle that prevented the usage of computers at the school by the CCT (see Chapter Four).

Literature suggests that the school principals’ comments influence the teachers’ motivation. In the present study, it was clear that some school principals did not take active roles in monitoring the usage of computers. Among the four schools, only the school principal for Samusisi regularly monitored the usage of computers by popping in the computer to find out what problems were being experienced by teachers. However, as suggested by Ndobe supervision can only affect usage if the schools have procedures or systems in place to monitor and evaluate the outcomes of learning, teaching and managing (Chapter Four,). The

current finding suggests that school principals did not perform their role properly as prompted by the School Performance Indicators for Schools and in the literature. The *School Performance Indicators for Schools* expects that school principals should monitor at least two lessons of novice teachers per term, if the teacher is experienced they should monitor once per term and provide immediate feedback to the teacher. I believe that since ICT is new in these schools and its usage has not progressed to the stage where teachers are fully utilising it in their teaching, school principals should be paying ICT more attention. Literature suggests that how the performance of teaching personnel is evaluated has a major impact on teacher commitment and efficacy. Danielson and McGreal (2000) makes this clear by stressing that "evaluation of teacher performance can help teachers improve their teaching and learning, increase personnel development, and bring feelings of empowerment to those dedicated to the teaching profession". The point I am trying to make here is that the supervisors' comments influences the teacher's motivation.

Data in Chapter Four suggest that school principals are expected to take an active role in supervising and monitoring computer usage. The findings suggest that only the school principal for Samusisi and Kazizila regularly monitored the usage of computers. Although the practice used by the school principals for Samusisi for popping in the computer lab to find out from the CCT how computers are used and what problems are experienced still has its flaws, her practice keeps her informed about the level of computers usage at the school.

5.2.2.3 Training

The guidelines for school principals further maintain that school principals are accountable for the continuous development of teaching and non-teaching staff by planning and organising the necessary development activities. In the current study, data suggest that only Samusisi and Chwanga had programmes where teachers are trained. This finding suggests that school principals for the two schools performed their roles as suggested by the guidelines and literature. At Samusisi, the school principal delegated one of the teachers who obtained the ICDL certificate to continue mentoring his colleagues. This practice relates well with the literature that suggest that professionally development is usually most effective when it is not delivered by extraneous experts in off-site locations, but is embedded in the life and work of

the school.

Summary

To summarise this section, data suggest that school principals performed their duties as stipulated in the guidelines for school principals. However, they neglected to monitor the usage of computers transferring the role to the computer coordinator teachers.

In the next section, I compare reasons why the usage of computers is effective at some schools and not at others. I argue that the leadership approach that the school principal uses contributes to the usage of the computers.

5.3 The school principal as a transformational leader

This section discuses the impact that the type of leadership has on promoting computers in schools. In chapter Two, I drew on transformational leadership literature to provide a theoretical framework for ICT integration in schools. To give an overview, transformational leadership is a type of leadership that challenges and encourages followers to develop and perform beyond expectations because they identify themselves with the mission and vision of the organisation and extend full support to achieve the mission. This in turn raises followers' motivation and willingness to accept extraordinary challenges.

This form of leadership requires that the leader is engage with followers as 'whole' people rather than as employee. Bass (1990) asserts that transformational leadership, occurs when "leaders broaden and elevate the interest of their employees to look beyond their own self-interest for the good of the group" (p. 21). As explained in Chapter Two, transformational leadership is suited to ICT promotion because it involves building a cultural behaviour that contributes to the integration of technology, which is aimed at improving teaching and learning.

These transformational approaches include active involvement in the acquisition of

computers, vision building, promotion of computer usage, and capacity building. However, the extent to which they exist differs from school to school. At some schools, they are non-existent. I now move to discuss the practices as they relate to literature.

5.3.1 Acquisition of computers

Literature on transformational leadership suggests that transformational leadership is characterised by questioning assumptions and promoting non-traditional assumptions. According to Northouse (2001), a transformational leader transforms individuals within the organisation by setting an example on how to initiate and implement change. Leithwood (1994) gives an expanded explanation that "even school administrators who employ the most transformational leadership practises perform management functions". One of those management functions is acquisition of resources. Data presented in Chapter Four suggest that some school principals (Samusisi & former principal for Kazizila) took the role of initiator by identifying the needs of teachers and findings ways on how to improve their teachers' practice by acquiring computers. These computers would serve as the catalyst for change once the computers were installed at the schools. Schiller (2003) explains that "computers and other forms of ICTs provide the way learners learn and teachers teach. In other words, computers are used as a vehicle change". Data suggest three school principals took an active role in the acquisition of computers in their schools. Two of the three wrote letters seeking donations.

However, the involvement of school principals in the acquisition of computers does not translate into their usage. Literature presented in Chapter Two suggests that for any innovation to be accepted, those in charge should take the leading role in facilitating change. Secondly, the people involved in implementing change should first be convinced of the need for change. The need for the leader to take an active role in facilitating change is evidenced at Makukuni where the school principal was the initiator in the acquisition of computers but once the computers were installed at the school he did not take active role in promoting their usage. I believe that the lack of involvement of the school principal in the promotion contributed to the underutilisation of the computers. Literature supports that the adoption of innovation is influenced by the degree of innovation in that organisation (Martins &

Terblanche, 2003, pp. 67-68). As mentioned earlier innovations such as computer acquisition requires structural changes in place, without these changes the integration of computers will most likely fail. Literature suggests that the school principal should take a leading role in driving the change.

5.3.2 Development of an ICT vision

In Chapter Two, I explored the roles of the school principal in the development of an ICT vision. Views of the respondents suggest that leadership and management are significant factors in the extent to which policy becomes practice and developments in ICT become part of the life of the school and experiences of staff and learners. This was evidenced at Samusisi where the school principal led the school in embedding the national vision into that of the school's ICT vision. This practice of establishing an ICT vision is supported by Bass (1990) in the dimension of '*inspirational motivation'*, which states that the leader provides vision and a sense of mission in followers. Literature in Chapter Two suggests that transformational leaders are good visionaries. The practice of developing a vision for ICT at Samusisi echoes earlier studies that documented the development of an ICT vision as the responsibility of the school principal (Fridell & Alexander, 2005; Leithwood, 1994; Akbaba, 2004; and Yuen and Cheng, 2000, p. 198). However, Manning, Curtis and MacMillen (1996, p. 21) point out that:

> Vision development does not translate into adoption on its own. The school leadership should establish the context and overarching goals of change that create opportunities for employees to turn these goals into actions.

Senge (1990) sees vision as the cornerstone of personal mastery and one of the disciplines necessary for community success. He writes, "One is hard-pressed to think of any organisation that has sustained some measure of greatness in the absence of missions, values, and goals that became deeply shared through the organisation". Manning et al., (1996, p. 21) stress that "a community vision fulfils four functions. The mission justifies existence, its goals provide direction, its values define acceptable behaviour and hold everyone together, and its benefit to the stakeholders is to energise work". This notion relates well with the ICT vision of Samusisi which states that "the vision of our school with regard to ICT is to be a computer literate school as well as community in order for us to meet vision 2030". Becoming computer literate justifies the existence of computers at the school and provides

direction (what is it the school want to attain?). Furthermore, the vision promotes desirable behaviour, that is, everybody at school being able to use computers.

Furthermore as noted by the school principal for Kazizila in Chapter Four, teachers and other members of the school should be involved in developing a vision for the school. As stressed by Moloi (2002, p. 50) in Chapter Two "shared vision is important as it keeps the school on course and helps it to align with what it is doing and what it wants to do in future". DePree (cited in Manning et al., 1996, p. 23) describes the role of the leader and the importance of having a vision:

> The first responsibility of a leader is to define what can be. The last is to say thank you. In between the two, the leader must become a servant and a debtor. This to me is the role of the leader.

The importance of establishing a documented vision, which is communicated to all staff members, was observed at Chwanga where teachers and the school principals gave contradictory ICT visions. Literature on the importance of documenting a vision notes that a documented vision gives the team a basis for early investigation work, so they can understand the effort and resources required to deliver what the draft visions are asking for. It also allows the team to discuss possible tradeoffs on scope, schedule, and resources at this high level and define a do-able project that will still meet critical customer requirements (Manning et al., 1996, p.7).

The study found that the development of a vision and making the vision public was the role of the school principal. This was made clear by the CCT from Kazizila, where the vision was awaiting approval by the School Board. At Samusisi, the ICT vision was displayed in the office of the school principal, staffroom, and computer lab, which served as a constant reminder to the staff.

5.3.3 Promotion of computer usage

Literature on the acquisition of computers suggests that how the school principal promotes the usage of computers determines the integration and usage of the computers in the school. In Chapter Two, I argued that effective school principals stay current on pedagogical and

technological advancements that take place in the field of education and communicate the developments to their teachers. In this section, I argue that a school principal who remains informed of the developments taking place in teaching and learning is able to promote the innovation to his or her followers. I further argue that an exemplary leader is best able to promote the usage of computers.

Data from Chapter Four suggest that the school principal for Samusisi is aware of current events within the field of education (technological and pedagogical) and communicates this knowledge to her teachers. There is no doubt that in her daily dealings she practises instructional and transformational activities. She regards herself as a lead learner who learns together with her teachers. In other words, she stimulates her followers by learning together with them. Without doubt, the school principal for Samusisi possesses the qualities practised by transformational leaders. Avolio (1994) explains that "leaders exercise idealised influence when they serve as role models with the appropriate behaviours and attitudes that are required to build trust and respect in the followers".

The data generated in the four case studies provide a clear distinction between school principals who promote computer usage by being role models of continual learning and the school principal for Makukuni who does not show these characteristics. Payne and Wolfson (2000, p. 15) stress that "a school principal who wants to 'break ranks' stays abreast of current thinking about schools and student learning by reading books and professional journals, attending conferences and professional meetings and diligently pursuing his or her own professional growth". As noted in Chapter Four, the school principal from Samusisi Senior Secondary School is enthusiastic about computers. She initiated the acquisition of computers after learning about the deployment that was to be undertaken by the Ministry. Her participation in the acquisition is evidenced in the school being the first to receive a computer lab in the region. Furthermore, the school principal took an active role in the ICDL training offered to teachers. The school principal continuously encouraged teachers to upgrade their computer skills by taking advantage of the facilities provided to them. Moreover, she led the school into developing an ICT vision. Gurr, Drysdale and Mulford (2006, p. 372) stress that "principals who are visionary and inspired can develop the same qualities in others". What I mean here is that through her daily actions (taking an active role in the acquisition, taking

part in the training on how to use computers, and motivating teachers) the school principal of Samusisi inspires her teachers to make use of computers.

Literature on transformational leadership suggests that the leader should build confidence in his or her followers, which forms the basis for accepting the radical change in the school (Simić, 1996). Kelly (2003, January) explains, "Transformational leaders make clear an appealing view of the future, offers followers' opportunity to see meaning in their work, and challenges them with high standards". This is done through motivational speeches and conversations and other public displays. At Samusisi, the school principal invited an official from the MOE to address teachers on why they had to receive computers and on what was expected from the teachers. Furthermore, having learnt that this researcher was doing Masters Degree in ICT, the school principal requested the researcher to address the teachers on the importance of ICT. Moreover, the researcher was requested to encourage some of the teachers who did not complete ICDL to do so. The argument is that an effective school principal will always look for exemplary ways for his or her teachers to learn something.

This study found that at Makukuni which had a school principal that was completely withdrawn from the computer lab and did not promote the usage of computers; computers were in a dilapidated state. Data presented in Chapter Four suggest that they were no programmes promoting the usage of computers at the school. One can easily conclude that the lack of involvement of the school principal in promoting the usage of computers contributes to the low use of the facilities at the school.

As indicated in Chapter Two, effective school principals stay current with pedagogical and technological advancements that are taking place in the field of education and communicate these developments to their teachers. At Samusisi, the CCT and other educators perceived the role of the school principals as that of a model for continual learning and motivator. This finding is in line with one of the five roles of school principals suggested by Payne and Wolfson (2000). As a model of continual learning, the school principal for Samusisi shared what she had learnt at the school principal's conference and devised a strategy on how her school would benefit from these developments. This was made clear in Chapter Four by Mutete from the focus group who commented that

> She also got involved and she would also write to set an example for us to say if this was the first time for me to use a computer and I am sitting for this test, why don't you, who already know the basics of how to do it.

Mutete's notion relates well with Bass's dimension of *idealised influence*, which states that followers want to emulate their leaders because of the strong emotional attachment and personal identification with the leader (Simić, 1996). Literature notes that one major implication of the school principal being involved in the training is that other teachers are more likely to focus on their own professional development (Payne & Wolfson, 2000). Payne and Wolfson (2000) further stress that "when school principals set an example as a lifelong learner; he or she establishes the culture of the school as a learning organisation where ongoing professional development is the norm". In the present study, the two school principals (Samusisi and Kazizila) promote the usage of computers by setting an exemplary example.

Literature suggests that in serving as a role model the school principal should make computers part of his or her daily life. The findings of the current study are however worrying. Although school principals at Samusisi and Chwanga encouraged teachers to use computers whenever they had time, they had no computers in their offices. Only the school principal from Kazizila had a computer in his office and was involved in teaching learners BIS.

As indicated in Chapter Two motivation and support of teachers to uplift their skills is among the important roles performed by school principals. The discussion in Chapter Four suggests that the school principals at Samusisi and Kazizila encouraged teachers to make use of computers, thereby advancing their computer skills. The principals saw their role as that of encourager. While at Kazizila, the CCT saw the role of their school principal as that of identifying which teachers needed training. At three schools (Samusisi, Chwanga, and Kazizila), the principals encouraged teachers to make use of computers. Furthermore, teachers were also encouraged by the school principals to update their skills and obtain certification. This finding is in support of Payne and Wolfson (2000) who identified the school principal as a helper, encourager, supporter, and source of information and resource for teachers.

Simić (1996) defines inspirational motivation as the ability of the transformational leader to empower and motivate the followers to appropriate behaviour when the transformation is being conducted in the organisation. Simić (1996, p. 52) further explains, “The leader has a task of clear and continuous stimulating of others to follow the idea”. They should behave in a way that motivates and inspires followers such as being enthusiastic and showing optimism to followers, stimulating teamwork and pointing out positive results. Simiĉ’s notion of stimulating others to follow the ideas is evidenced in Mutete’s comment “she also got involved and she would also write the exams to give an example to us”. Leithwood and Reihl (2003) make it clear that members of an organisation feel valued if they observe that their school principal cares about their personal needs and feelings. Bass, Avolio, Jung and Berson (2003, p. 208) explain that:

> Transformational leaders encourage their followers to imagine and contribute to the development of attractive, alternative futures by using motivational speeches, and conversations and other public displays of optimism and enthusiasm, highlighting positive outcomes that stimulate teamwork.

This notion is evidenced in the actions of the school principal of Kazizila who encourages his teachers to integrate computers in their teaching. Gurr (2000) argues that to perform the duties of the school principal effectively in ICT integration, the school principal should be very much involved in using ICT. In other words, the school principal should ‘walk the talk’ not ‘talk the talk’.

5.3.4 Staff development of teachers

There is plenty of evidence that transformational leadership influences employees’ motivation and performance. This subsection attempts to discuss the practices of the four school principals in upgrading the skills of their teachers from the angle of transformational leadership. Literature suggests that education must respond to the changing needs of students and teachers. As argued by Harris (2002) provision of training and support for staff is essential within any school improvement initiative. In the current study, two practices related to staff development emerged: staff development of teachers facilitated at the school level and staff development of teachers facilitated at the national level.

As mentioned in Chapter Two, availability of skills is central to the successful deployment of

ICT innovations that enable organisational learning. Literature on transformational leadership suggests that transformational school principals create risk free environments, and inspire others within the organisation to think differently. Furthermore, literature suggests that a transformational leader coaches, mentors and links followers needs to the organisation's mission.

The findings on staff development at the school level at the four schools are far from encouraging. Data presented in Chapter Four suggest that only two school principals had programmes where fellow teachers helped each other upgrade their computer skills. At three of the schools although participants reported to have received training of some kind, there were no platforms where teachers could share their experiences with others. Furthermore, data suggest that there was no proper coordination of training programmes offered at the schools. This was made clear by the CCT at Samusisi who reported, "It is not my role to decide on who should be trained, and it should come from the individual". The school principal also did not regard training of teachers as her role. In spite of this weakness, they were exemplary practices at Samusisi, which is encouraging. The willingness of the school principal to participate in the training for basic computer literacy classes together with her teachers promotes a culture of learning. Furthermore, the willingness of the CCT to cascade training to his colleagues despite his busy schedule is encouraging.

Tsang and Antony (2001) stated that organisations should use all employees skills and abilities, and organisation members in different departments should work as a team in any problem-solving initiatives. In order to encourage employee commitment and involvement, successful organisations put great importance on empowering their employees. An intriguing finding from the four sites was that the respondents viewed the role of the school principal in providing staff training differently. Four key issues linking school principals to the continuous professional development of teachers were identified. They are model for continual learning, motivator, supporter, and facilitator.

Another issue emerging on staff development was the lack of follow up on training. At Kazizila and Makukuni teachers have not received any further training on computers since the completion of workshops offered by NETA and Pearce Corp Volunteers about three years

ago. Views of the respondents involved in this study emphasise the importance of follow up training. As stressed by Jones (2004) lack of teacher confidence and competence are major obstacles to effective implementation of ICT in schools. Literature on staff development for teachers notes that a systematic and integrated approach to staff development that focuses on the professional learning of teachers and establishes the classroom as an important centre for teacher development is central to authentic school improvement (Hopkins, 2001). Interestingly Silume from the focus group at Chwanga cited that workshops that take place within the classroom setting are important in ensuring that ICT is integrated in teaching.

However, the challenge for school principals and CCTs is designing professional development programmes that encourage effective teaching practice with ICT tools.

Documents reveal that parallel to the deployment of computers to schools; the Ministry was cascading ICDL training to teachers. This training was aimed at giving teachers basic computer literacy skills. This was to be followed by training on ICT integration. Furthermore, two teachers per school who received training on ICT literacy would receive training on first technical support. The role that school principals were expected to play in this training was made clear by the school principal of Samusisi, “my role was just to make sure that my teachers were there”. However, despite these remarkable efforts to train teachers, some of the teachers voiced their concerns on the duration of the training and suggested that the training be extended because of the low computer literacy level of teachers.

These findings led me to ponder if transformational leadership is the solution to effective ICT integration. In the present study, the school principal for Samusisi demonstrated five qualities that are related to transformational leadership. Firstly, she continuously provided moral support to her teachers by being there with them during the period of ICDL training, and continuously monitoring their usage of computers. Turner, Barling, Epitropaki, Butcher, and Milner (2002, p. 305) posit, “Leaders with more complex reasoning will be able to draw on more sophisticated conceptualisation of interpersonal situations, are more likely to think about problems in different ways, and are cognizant of a larger number of behavioural options”.

Secondly, she established a structure that promotes participative decision making by establishing a technology committee that advises management on all activities that have to do with ICT. Thirdly, together with her teachers they developed an ICT vision that gives them the sense of an overall purpose for having computers. Fourthly, the school principal challenged teachers to be innovative.

Now I move on to examine the contribution of computer coordinator teachers to the promotion of computer usage in schools.

5.4 Support for ICT within the school

This section attempts to discuss the relationship between the school principal and other teachers in relations to the promotion of ICT in the four schools. The section discusses the supporting role that is provided to the school principal by computer coordinators. Data presented in Chapter Five suggest that two types of school principals existed at the four schools, those who were supportive of computer activities and those who were not.

At Makukuni, the school principal claims to have been the mastermind behind the acquisition of computer. However, he does not support the teacher assigned to manage the computer lab. The CCT and one of the educators made this clear during my informal conversations. My informal chats with Sikomoni (personal communication, July 20, 2009) suggest that the school principal is the stumbling block for change at the school. Schiller (2003, p. 172) stresses that “school principals have a major responsibility for initiating and implementing school change through the use of ICT”. Therefore, they should facilitate complex decisions about integration of ICT into learning and teaching. Available evidence suggests school principals at schools that were satisfactory commented that the school principal encouraged them to use computers. Furthermore, the data suggests that the school principals supported CCTs in managing the computer lab.

Moving to issues of the type of support given to the school principal by the teachers in promoting the usage of computers and support given to computer coordinators by school principals, data suggest that school principals performed the role of coordinator, encourager,

and authoriser in sporting CCTs. At the three schools that showed a healthy relationship, school principals supported the CCTs in coordinating the maintenance of computers. This involved making telephonic calls to technicians. However, how this role was performed at the three schools differed. As reported in Chapter Four, at Samusisi, the school principal was responsible for communicating with the NETSS centre and she was responsible for coordinating transportation of computers for maintenance. This practice was also observed at Makukuni, where the school principal was responsible for buying cartridges for the printer and other small tasks. This study found that in contrast to the practices at the other three schools, at Kazizila the school principal was responsible for the lab keys but could not attend to technical support. The CCT supported the school principal in maintaining computers and attending to technical problems.

Data on who manages the computer lab and who runs training for teachers and learners support the notion of teacher leadership in three schools. At Samusisi, Chwanga, and Makukuni, the CCTs are responsible for facilitating the training, so the CCTs support the school principal in empowering other teachers. Congruent with the literature (see Harris, 2002) and other research, this study found that school principals delegated committed teachers to lead the activities of the computer lab. At Samusisi, a technology committee was established to oversee issues such as formulation of computer lab rules and advising the school principal on any other technological issues. This practice is in line with Anderson and Dexter (2000) recommendation that called for establishment of technology committees in schools.

In Chapter Two, I presented a definition of teacher leadership in relation to ICT drawing on Gonzales and Behar-Horenstein's (2004) conceptualisation. They defined teacher leadership as those individual teachers who participate in some leadership capacity in the school, such as facilitating professional development through workshops, modelling teaching strategies in the classroom, taking formal leadership roles in departments or teams or participating in shared decision. Smylie and Denny (1990) explain that teacher leadership is aimed at improving teaching and spearheading education reform. According to Andrew (cited in Hook, 2006, p. 13) "the teacher leader is a master teacher and curriculum leader, devoting talents to stimulating planning and implementation of curriculum change". He goes further to explain

that “it is not meant to refer to administrative or bureaucratic leadership; rather a central role for teachers in promoting change which improves the quality of education”. Most writers refer to teacher leadership as the role of department heads and subject heads. Teacher leadership in the current study refers to computer coordinators. The concept also refers to the technology committee at Samusisi. Literature suggests that effective school principals delegate some responsibilities to their competent teachers in the process empowering their teachers and freeing themselves (school principal) to focus on major issues. Young (2007, p. 20) stresses that the principal is not the only individual in a school who exercises instructional leadership. I however argue that the success of any assigned teacher in a leadership position depends on whether the school principal and the middle management team relinquishes power to the assigned teacher, the extent to which fellow teachers accept the influence of their colleague and to what extent the teacher is supported (Harris & Muijs, 2002, p. 1).

Teacher leaders (computer coordinator teachers) play significant roles in promoting the usage of computers in schools. For instance, in the current study it was found that the CCTs at Samusisi and Chwanga were responsible for training and supporting teachers and learners in basic computer literacy. By engaging in the training activities, the two teachers assumed the leadership role and contributed to the school’s improvement, inspired excellence, and empowered both learners and teachers to participate in educational improvement. Camacho et al. conclude that “the role of the teacher leader is to improve teachers teaching skills, to influence staff, to accept change, and to share expertise” which fits with Harris’s (2002) second role of empowering teachers and giving them some ownership of particular development. In the current study, the CCTs for Samusisi and Chwanga that had programs where learners and teachers were learning basic ICT skills were also responsible for scheduling times for learners to be in the lab.

Another interesting finding was on the role CCTs played in the maintenance of computers. At the three schools even at Kazizila where the school principal kept the keys of the computer lab and was responsible for teaching BIS to learners, teachers did the maintenance of computers.

Unfortunately, a number of factors impinge on the commitment to the promotion of computers. Literature suggests that teacher leadership can only be fostered and nurtured in a culture that is supportive and where the relationship is positive. In the current study, computer coordinators pointed to a lack of skills and excessive workload as inhibiting them from performing their roles. This finding correlates with Zin's study of 1997.

5.5 Challenges affecting computer usage

In Chapter Two, I mentioned that several studies were undertaken on an international level to investigate factors that affect the usage of computers in schools. In the current study, data presented in Chapter Four suggest that schools face a number of challenges that hamper the usage of computers. Some of the participants revealed that their schools have lack of resources, such as LCD projectors, chairs in computer labs, internet connectivity, and educational software. The absence of these peripheral devises prevented teachers who were ready to integrate ICT in their teaching from using computers to the fullest extent. Teachers expressed the need for more computers. However, there was a general understanding among the participants that the Ministry alone cannot provide all the schools with all the desired equipment.

Technical support of computers that were acquired outside the ministry's deployment was another thorny issue. Three schools that acquired computers from NGOs and from SDF raised their dissatisfaction with the type of support they receive from local technicians. One of the school principals highlighted the need for school principals to have technical skills so that schools are not cheated on what they are charged by technicians who charge exorbitant prices.

The absence of follow up training and refresher training for graduates that joined the teaching profession was a major problem for the continuous professional development of teachers. There was also a strong concern on evaluation of national projects such as computer deployments to schools as no evaluation (monitoring) reports are disseminated to schools to assess the effectiveness of the programmes.

5.6 Conclusion

Overall data presented in this research further support previous research and confirm significant factors that contribute towards an effective ICT integration. It emerged that same school principals are promoting the usage of computers in their schools by encouraging teachers and learners to make use of the computers. Others promote the usage by participating in trainings together with their teachers, while the other school principal promotes the usage by teaching computer literacy to learners. The findings of this study suggest that for ICTs to be fully utilised, effective leadership in schools is critical.

Factors affecting the usage of computers in schools were also discussed concealing issues that need to be investigated further to insure the success of ICT projects. The next chapter focuses on the summary of the main findings, conclusions and recommendations for future research and for practice.

Chapter6

Summary of findings, conclusion and recommendations

6.1 Introduction

This chapter provides a summary of the research findings, conclusions drawn from data presented in Chapter Five, and recommendations of the study. There are four sections in this chapter: a summary of procedures, a summary of findings, recommendations, and conclusions.

6.2 Summary of procedures

The purpose of this study was to investigate the role of school principals in promoting the usage of computers in schools. To achieve that goal, the research was guided by the following research questions:

- What are the principal's perceptions of their role in promoting computer usage in their schools?
- What guides principals in their quest to promote the use of computers in their schools?
- What are the obstacles that principals face in ensuring the effective use and management of computers in schools?
- What intervention strategies do principals employ to encourage the use of computers at school?
- How do teachers perceive the role of school principals in supporting computer usage in schools?

As mentioned earlier, the methods used for collecting data, analysing the data and ensuring trustworthiness were qualitative. Four schools were selected for the study. Three of the schools were urban, while one was a rural school. The study employed purposive sampling

because of its ability to produce data that are rich. Schools were selected on the criteria that they should have their computer lab for more than a year to provide rich data. Semi structured interviews was used as the primary tool of data collection. In addition, field notes and pictures of computer labs were taken during the period of data collection. Data collected were coded and placed into seven categories (a) vision, (b) acquisition, (c) access, (d) usage, (e) teachers confidence and competence, (f) maintenance, and (g) challenges. These categories were then used to generate themes.

Three problems were encountered during the period of collecting data. The researcher was denied access to research site at one of the school despite an earlier approval. On the agreed day the researcher was supposed to collect data the school principal referred the researcher to other schools. However, this did not impact much on the research as another school was identified as a backup. At the other school, the school principal was not corporative which resulted in the researcher making several trips to the school. However, with much persistence from my side, the school principal was able to see me and gave rich data. Trustworthiness of the study was achieved by using multiple sites, multiple sources, and multiple tools. Furthermore, the descriptions of each participating school allow the outsider to see if they could transfer the research finding to another school context.

6.3 Summary of findings

This section gives a summary of the main findings as presented in the previous chapter in relation to research questions. The findings clearly show that they were few similarities in how the schools acquired their computers. The ministerial deployment was the most common form of acquisition followed by use of school development fund for administrative computers and donations. In exception of the principal for Samusisi who took the initiative to contact the office responsible for the deployment, other principal did not take an active role in the acquisition of computers deployed by the ministry. However, other schools (Chwanga, Kazizila & Makukuni) acquired some of their computers through NGOs and data suggest school principals were often the initiators of the acquisition process. The school principals for Makukuni and the former principal for Kazizila both wrote letters requesting for donations. Another finding from schools that acquired their computers through the ministry's

deployment is that school principal had to complete a questionnaire from the office responsible for overseeing the deployment, which asked if the school had space, and security mechanisms put in place. Another commonality was on the way the schools acquired their computers for the secretaries. All four schools bought their computers through SDF. At Chwanga and Makukuni, the educators perceived the role of the school principals as that of facilitating the acquisition of needed resources.

In terms of available infrastructure, the study found that there were differences at the four schools. Kazizila was more resourced than the other three schools. Kazizila have two computers used by teachers in the staff room, one in the principal's office and secretary's office and thirty in the computer lab. Makukuni was the least resourced school, with only eleven computers that were in working condition.

Findings on the ICT vision of the school reveal that only Samusisi had a documented vision. Kazizila had developed its vision but was awaiting approval of the school board. There were contradictions at Chwanga and Makukuni on the ICT vision of the school among the participants interviewed. The current findings suggest that schools with pro-active school principals were only schools with established visions. There is an agreement between the body of literature and the findings of the research that the school principal is the person responsible for ensuring that the school develops a vision.

The findings on user policies were not encouraging. Only two of the four schools reported to have an ICT user policy. At Makukuni, not all teachers and the principal were involved in the drafting of those rules. At Samuisisi, although the technology committee drafted the policy, it did not direct users on what was available, how to use what is available, and where to go if there were faults.

Findings for research question two indicates differences on how school principals promote the usage of computers. School principals that demonstrated the qualities of transformational leadership promoted the usage of computers by taking part in training offered to teachers and encouraged teachers on different platforms to make use of computers. At Samusisi the school principal promotes the usage of computers by encouraging teachers in concurs meetings to use computers. Furthermore, she regularly participates in trainings at the school. Moreover,

she encourages learners on morning assembly to make use of computers. At Kazizila, the school principal promotes the usage of computers by teaching BIS to learners and being in charge of the computer lab. In addition, he encourages teachers in meetings to make use of the computers. At Makukuni, the CCT felt the school principal was not promoting the usage of computers instead; he was discouraging teachers and learners from using the computers. Most of the teachers perceived the role of the school principal in promoting the usage as that of encouraging teachers to use computers, supervision, and monitoring of the usage.

The findings on maintenance of computers suggest that availability and maintenance of computers depended on the kind of school (advantaged or disadvantaged) and the way the computers were acquired rather than on the role of the principal. Schools that acquired their computers through the ministerial deployment received satisfactory technical support from the ministry while schools that acquired their computers through other sources had to rely more heavily on the principal to pro-actively seek support. An intriguing finding on maintenance of computers were found at Samusisi and Chwanga that established a where they could withdraw money for servicing computers. The schools however faced challenges as the region lacked qualified personnel in the region. Another finding on maintenance of computers is that school principals were responsible for coordinating buying of replacement parts at two schools and were responsible for contacting the technicians.

The findings on teachers' confidence in using computers and training of teachers produced mixed results. The findings suggest that at some schools (Samusisi & Chwanga) staff development of teachers is satisfactory or better, while at Makukuni staff development of teachers is less than satisfactory. There is no programme where a member of the teachers mentors others.

An interesting finding on staff development is the practice of the school principal for Samusisi who takes part in training programmes with teachers. Learning together with them and challenging them to do better than her. Another important finding on staff development is the role that computer coordinator teachers play in cascading the ICT training to teachers. In effective schools (Samusisi & Chwanga), it is the computer coordinator teachers who are responsible for running staff development. At Makukuni where participants reported low

computer literacy level for teachers, no programmes for computer literacy were given to teachers.

Findings from research question four produced numerous challenges that are faced by school principals in their role as technology leaders. The most common finding was that of lack of internet connectivity. Two of the school principal indicated that they did not know where to go to install network ports at their schools. Another issue emerging on this question is on affordability of connecting to internet once the schools were finally connected. Chwanga that had internet connectivity before indicated that the N$300.00 to be paid by the schools was too much for schools that were financial challenged.

Another finding on challenges from Chwanga, Kazizila, and Makukuni was lack of skills for both school principals and teachers. Data reveal that the competence level of teachers at the three schools is low in comparison to Samusisi that have two teachers with ICDL certificates and four teachers with starter up certificates for the first four ICDL modules. Another challenge identified in this area is lack of personnel at the regional level where school principals and teachers could go for help.

6.4 Conclusion

This study investigated the role of school principals in promoting the usage of computers in schools. The following conclusions can be made based on the findings of this study.

1. Good leadership is a critical factor in the development of ICT. The findings at Samusisi indicate that for any innovation such as acquisition of computers to be accepted by teachers and have an impact, the school principal should be actively involved in promoting the usage. Research on successful ICT development has consistently stated that school principal who took an active approach to innovation can foster an environment that has greater benefits to their students and staff (Schiller, 2003). The finding at Makukuni where the school principal indicated to have been instrumental in the acquisition of computers but did not take active part in its promotion suggests that technology integration requires commitment from the leader to facilitate and support the

change. Barth (2004) comments that "the school principal can create or stop almost everything on a campus".

2. The second conclusion of this study is that integration of computers into teaching and learning requires a different kind of leadership. Computer innovations unlike other changes that occur at the school such as acquisition of books requires structural changes put in place for the changes to have an impact. This includes addressing issues such as infrastructural and pedagogical practices that teachers have been practising to new ways of doing things. The finding at Samusisi that reported high demand of computers suggests that the school principal should find innovative ways of motivating teachers and learners to use computers.
3. The third conclusion of this study is that successful integration of computers into teaching and learning requires staff development programmes that are supported by school principals. The findings at Samusisi suggests that the involvement of school principals in professional development programmes given to teachers intrinsically influences teachers to be committed towards the programme. Clark and Denton (1998) support that school principals should be involved in staff development.

6.5 Recommendations for practice

Based on the findings and conclusions from this research study, the following recommendations are made.

- School principals should initiate the development of ICT vision and technology plans that direct them on where they are going. Vision formulation should be inclusive of all communitiy members of the school (that is teachers, representatives of learners and parents). Literature suggests that for a vision to be realised, the school principal should be involved in its formulation and lead the school in implementing it (Chang et al., 2008).

- To promote ICT usage in schools, school principals should adopt strategies that make ICT the daily task of teachers. These strategies could include teachers submitting their daily preparation electronic once schools have internet connectivity. Furthermore,

school principals could announce staff meetings and other important notice via emails.

- Teachers need to be supported to set up platforms that enable them to share experiences, opinions, and teaching materials. School principals as overall overseers of all resources at the school should plan contact time for teachers to share their experiences in using ICT in their lessons. This could be expanded to cluster, circuit, or national level. Schools should initiate collaborations with other schools within their clusters, circuits, and region, national or international level where they share experiences.

- Lessons from other countries that have successfully integrated technology suggests that setting up of administrative committees to manage ICT facilities is a key for ensuring the sustainability of ICT initiatives. Beyond the school, it is important for schools to seek political support from local authorities, regional and national education authorities to prepare for long-term opportunities of funding and have ICT recognised as part of the curriculum. To avoid conflict of who should be using the computers, the school principals should ensure that there are available schedules on who should use the computers and at which time.

- On the national level, the ministry should consider appointing advisory officers to oversee training and advice teachers on ICT matters. Furthermore, the ministry should set guidelines on how schools should manage ICTs without necessary imposing them on schools.

6.6 Recommendations for future research

I believe the way forward is to expand this research to a wider population using a mixed methodology approach. Such a study could be limited to one level (primary, combined, or senior secondary) or it could involve a combination of all levels and analysed for any significant difference.

Another interesting area would be the effect of school culture on ICT integration. This study could look at issues such as the impact of the school's ICT policy. The study could employ structured interviews as a means of data collection.

Another area of interest is the perceptions and understanding of school principals who received training at tertiary institutions in recent years and school principals who were trained when computers were unheard off. The study could compare their perceptions of computers in society to determine how their understanding impacts on the usage of computers in their schools.

6.7 Potential Value

This section discusses the potential value of the study. My research question was focused primarily on principals as overall overseers of all resources that are taking place at the school. My personal experience as a computer coordinator teacher five years ago sparked my curiosity about the issue. As a computer coordinator, I received little support from the school principal who was not fascinated about computers. The interest in the topic was renewed in 2008 in my involvement in the collection of the TRC Baseline data. The renewal came due to complaints that I received from some TRC managers who complained that despite the government and NGOS deploying computers to schools, some schools did not make use of the many ICTs accorded to them. As an employee at institution tasked with the development of the curriculum for schools and training of teachers, this concern struck me further. It was against this background that I found it necessary to investigate the extent to which school principals promoted or supported the usage of computers at their schools.

On the human side, I believe that school principals and computer coordinators will find this research useful as it identifies characteristics of effective ICT promotion. Furthermore, the study identifies challenges that impede the promotion of computers. The research is also valuable to schools where the study was conducted. School principals and CCTs could work to improve on their weaknesses.

Finally, the study has the potential to inform policy as well as teacher education programmes.

6.7 Limitations

The population of this study is limited to school principals, computer coordinator teachers, and selected educators at four schools. Therefore, the findings cannot be generalised to other schools but transferability in terms of the appropriateness of the context to other settings is possible.

6.8 Reflection on the research process

Before I conclude, I would like to reflect on my personal journey during the period of doing this research. This study has broadened my research skills, attitude, and knowledge. The study has exposed me to different research paradigms and different research methods. Furthermore, this study has broadened my understanding of the importance of triangulation in a study. Moreover, the study has sharpened my writing skills.

On the professional level, this project has broadened my understanding of the phenomenon through exposure to professional literature, discussions with colleagues, presentation, and writing process which will contribute to my contribution towards redressing some of the identified weakness. It is worth mentioning that the research process was challenging and demanding requiring much time. However, it was rewarding personally and professionally.

6.9 Concluding Remarks

ICTs are useful tools for change and hold the potential for transform the nation into the knowledge based society as outlined by Namibia's Vision 2030. The study on the role of school principals in promoting and managing the usage of computers in selected schools has confirmed that the active involvement of school leadership is more crucial if technology is to become part of the school culture.

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Appendices

Appendix A

Interview questions for school principals

Vision of the school

1. What is the vision of the school regarding ICT?
2. How do you see yourself within this vision? (What is your role within this vision)

Acquisition

1. Tell me how the school acquired these computers?
2. What was your role in the acquisition?
3. What kind of hardware do you have here?

Access

1. Who has access to the computers?

2. Who decides who have access to the computers?

3. What is your role in determining who have access?

4. How long do they have access to the computers?

Usage of computers

1. Who uses them and for what purpose? For example, are they used by learners, teachers or the community? In terms of teaching, learning, research, communication and administration. Are they also used for recreation?
2. What is your role in encouraging teachers and learners to use computers?
3. How is the usage monitored?

User policy

1. Do you have an acceptable user policy for the computers? (If yes what does it cover and who was involved in drafting it?)

Maintenance

1. Tell me about the maintenance of these computers.
2. What is your role in it?

Technical support

1. Tell me about the technical support?
2. What is your role? Who initiate this?
3. Do you allow teachers to tap into the resources for the school if there is a problem?

Financial implications

1. Where does the money for maintaining the computers came from? i.e. buying cartridges, upgrade software.

Teachers training

3. What is the level of literacy of teachers in your school?
4. How do you support teachers who want to know more about computer? Do you encourage them to go four courses?

Challenges

1. What are the challenges/ obstacles that hamper the use of computers at the school?

2. Did you receive any specialised training preparing you for your role as a technology leader?
3. How were these challenges addressed?

Conclusion

Anything else you would like to share with me?

Appendix B

Interview questions for Computer Co-ordinators

Ice breaker questions

1. Are you the person directly responsible for computers?
2. How were computers acquired?

Computer usage

1. How are computers used?
2. Is there any acceptable user policy?
3. How is the computer usage promoted in the school?
4. What is the role of the school principal in promoting the usage?

Maintenance

1. Who handles technical problems?
2. To what extent are funds made available to acquire ICT equipment or repairs?
3. What is the role of the school principal in handling maintenance problems?

Teachers training

1. What is the literacy level of teachers in using computers?
2. Who is responsible for providing training?
3. What is the principals' role in determining who should be trained?

Monitoring

1. Who supervise (monitor) the use of computers at the school and to what extent?
2. What is the school principal in monitoring the use of computers at the school?

Challenges

1. What obstacles or challenges have you experienced that might have affected your use of computers?
2. How were these challenges addressed?
3. How was the principal involved in addressing the challenges?

Appendix C1

Focus group interview schedule

Access

1. Describe how accessible are computer labs to teachers and learners throughout the day.
2. For how long are they accessible?
3. What are the procedures that you always follow to have access to the computer labs?

Usage

1. What kind of support do you receive from school principals or computer coordinator?
2. Please, describe how you most frequently make use of computers. We don't want know all of what you do, but just most often do?

   (Probe for uses directly related to instruction, administration and personal productivity)

Challenges

1. What barriers have you encountered in trying to use computers?
2. How were the challenges resolved?

Monitoring

1. Where lessons where you intergraded ICTs observed and who observed them?
2. Who monitors the use of computers at the school and how often is monitoring done?
3. How supportive are school principals in encouraging the use of computers in the classroom?
4. If things are to improve, what do you recommend that the school principal should be doing?

Appendix C2

Points to be covered during the focus group

Good afternoon colleagues,

My name is Mighty Katulo working as an Educational Resource Officer in the Ministry of Education at NIED. I am currently on a full time one year study leave at Rhodes University. Let me thank you in advance for making time to meet with me. I will honour your time by making sure I wrap up within the agreed time.

Does anyone mind if I record this session for our record. The recording won't be shared with the school principal, the regional office or the entire Ministry. All information provided in this focus group will be confidential. For example, I will not disclose who actually participated in this focus group. My evaluation will result in a written report (thesis). This will be submitted for the fulfilment of the requirements for the master of education degree.

Appendix D

Interview Schedule for MOE official

- What was expected from school principal before the deployment of computers to schools?
- At the installation of the lab, what was expected from the school principals?
- How were these principals prepared for these roles as technology leaders?
- What is expected from school principals in terms of technical support?
- What are the guiding tools which are in place that will assist school principals in monitoring the usage of computers at schools?
- What financial implications does this project have on schools?
- Who will take care of buying cartridges?

Appendix E

CONSENT FORM

I agree to take part in the research project. I have had the research explained to me, and I have understood the explanation statement read to me. I understand that agreeing to take part means that I am willing to:

- Be interviewed by the researcher,
- Allow the interview to be audio recorded, and
- Make myself available for a further interview should that be required

I understand that any information I provide is confidential, and that no information that could lead to the identification of any individual will be disclosed to any other party. No identified personal data will be published. I understand that I will be given a transcript of data concerning me for my approval before it is included in the write up of the research.
I understand that my participation is voluntarily; that I can choose not to participate in part or all of the research, and that I can withdraw at any stage of the research without being disadvantaged in any way.

Name: …… Date:……

Signature:……..

Appendix F

Permission Letter to conduct research in the selected schools

Republic of Namibia

MINISTRY OF EDUCATION

Private Bag 5006, Katima Mulilo, Namibia

Enquiries: Mr A M Samupwa
Ref. No:

Tel: (066) 253708/253002
Fax: (066) 253187/252939

01 July 2009

Rhodes University
Department of Education
PO Box 94
Grahamstown
6140

Fax: +27(0)466228028
Tel: +27(0)466038383/4

Attention: Dr Lorenzo Dalvit

RE: PERMISSION FOR MR M KATULO TO CONDUCT RESEARCH IN THE REGION (SCHOOLS)

Your undated letter in the above subject matter refers.

This is to acknowledge receipt of the above mentioned letter, kindly be inform that permission is granted to Mr M Katulo to conduct research in our schools within the region as requested. Taking into account that this research do not interferre with the teaching and learning processes.

Therefore, I would like to wish him success in his research.

Kind Regards!

MR L S LUBALEZWI
REGIONAL DIRECTOR

MINISTRY OF EDUCATION
CAPRIVI REGION
2009 - 1 - 0 1
DIRECTOR
PRIVATE BAG 1206 KATIMA MULILO
REPUBLIC OF NAMIBIA

Appendix G

Transcriptions

School Principal transcription for Samusisi S. S. S

Interviewer: What is the vision of the school regarding ICT?
Interviewee: The vision of our school with regards to ICT is to be a computer literate school as well as community in order for us to meet vision 2030.

Interviewer: How do you see yourself within this vision?
Respondent: To learn together with my teachers and learners so that they are encouraged.

Interviewer: What kind of hardware and software do you have here?
Interviewee: We have the keyboard, the mouse, the printer as well as the overhead projector.

Interviewer: Do you have a laptop that can be used for presentations at the school?
Interviewee: Yes two of my teachers who have the ICDL certificate received some laptops. Although these laptops are in the possessions of the two teachers, the school can still use them.
Interviewer: Do you have an acceptable user policy for computers?
Interviewee: Yes, we have it.

Interviewer: What does the policy cover? Just in brief.
Interviewee: In other words, it covers who to use the computer as well as some warnings where we don't allow these CDs from outside to be used on our computers, and other important warnings where we don't allow teachers to go to the computer lab with other materials like for example coffee and other materials that can spill on computers. These rules also include learners.

Interviewer: How did the school acquire the computers?
Interviewee: We acquired these computers through ETSIP programme in connection with TECH/NA!

Interviewer: What was the role in acquiring these computers?
Interviewee: Being the principal, it was during in a meeting that I attended in Okahandja or a congress and then we had of these ETSIP and ICT whereby we were informed that rural schools will be technically offered these computers through ETSIP ,and then what I did was to follow up with NIED people and then we acquired a questionnaire ,a questionnaire was filled in, after filling up the questionnaire a group of people from techno came , they accessed our room , to see whether our room have some burglar windows as well as burglar door fortunately enough we qualified, then it was in 2007,2008 we were supplied with computers. That is the role I applied. And then after acquiring this computers, we received a teacher trainer/a facilitator from ministry who trained all teacher including my self ,and then at the end of that training we wrote an international examination two of my teachers managed to get a start up certificate and then the other two managed to get this international driver's licence for computers.

Interviewer: You mentioned that you received training, what was your role before the trainer come to the school?
Interviewee: It was just an arrangement with the ministry because immediately when they give out the computers they see to it that there is a trainer or facilitator to go and give the training.

Interviewer: What did the ministry except from the school with regards to this training?
Interviewee: Not really, the only issue the ministry raised was teachers try this level best to get skills to drive computers.
Interviewer: Who uses the computers and for what purpose?
Interviewee: Both the teachers the learners and the secretary they use the computer s to get the necessary skills as well as for teaching and learning process.

Interviewer: What does the secretary use computers for?
Interviewee: For example during the typing school programs she can go and use those computer as you know we are in a rural area previously we did not have access to computers ,even our Secretary was using typewriter so this program helped her a lot that is why we involve her.

Interviewer: Does the secretary have a computer in her office?
Interviewee: Yes, immediately after she acquired the training, the school struggled from the development fund we secured one computer for her which she is now using in her office.
Interviewer: What do learners use the computers for?

Interviewee: The computers are used for computer literacy classes as we do not have information to use it for other purposes.
Interviewer: Are these computers used for administrative purposes?
Interviewee: Sometimes, as mentioned some documents can be typed there and sometimes when we have meetings we can use them.

Interviewer: What is your role towards promoting computer usage?
Interviewee: For example as it was mentioned when we were given this computers that teachers should try their level best in order to meet vision 2030, before we reach vision 2030, all teachers should be computer literate as well as acquire the start up certificate or ICDL, I used to encourage my teachers to work very hard during their spare times in the afternoon and evening as well as weekends if possible. Just encouragement because both my self and my teachers we were learning together.

Interviewer: How do you monitor the usage of computers?
At the end of our training , as I mentioned earlier two of one colleague managed to get the ICDL, we have teacher computer coordinator, he is the one who monitors the learners for both the learners and teachers and learners in the after noon , evening as well as weekends. And then we have a time table that the management as well as the teacher coordinator lab we settle down the extra curricular time table for our computers.

Interviewer: Who forms the management?
Interviewee: The school principal, HOD and senior teachers.

Interviewer: Who have access to computers lab?
Interviewee: Teachers and learners.

Interviewer: Who is keeping the keys?
Interviewee: The computer coordinator.

Interviewer: What is your role in determining who have access?
Interviewee: It is compulsory, as I have already mentioned that we secured our computers through ETSIP programme. In other words whether we like it or not, as teachers as well as learners we have to get the training particularly for the teachers as I have already mentioned that before we reach vision 2030 every body, think this is a well known issue should be possession of even a start up certificate.

Interviewer: For how long do they have access to computers?
Interviewee: For the learners, in a week they have 40 minutes, again we have the extra time table whereby in the evenings they have access to the computers for 30 minutes and during weekends they have access for 30 minutes again. The only problem is when it comes to the side of teachers ,as you know that at times we have these afternoon lessons of which they don't have time these except for the evenings when the teacher is not so committed and then all use computer lab.

Interviewer: You are saying that learners have access to the computer lab through out the week.
Interviewee: Yes. once per week and an extra macula time table in the after noon again ,each class should have a lesson there from Monday to Friday again once.
Interviewer: Is these grade11 and 12?
Interviewee: Starting from grade 8 up to 12.

Interviewer: Who maintenance these computers?
Interviewee: When it comes to the maintenance ,it is still the teacher, s group which are helping us , but with these other minor maintenance since our two colleagues received this ICDL certificate they can but with the real maintenance we have to go through NETSS.

Interviewer: What about the secretary, s computer?
Interviewee: As I mentioned we bought this computer through the development fund, we look for local people to repair it.

Interviewer: What is your role in that?
Interviewee: For the computer lab at the moment if we have a computer giving problems we use to consult Ms Conklin from TECH/NA! and then arrange for transport to take that computer for maintenance and then when it is done they send it back.

Interviewer: Who does the arrangement?
Interviewee: Myself.

Interviewer: Do you allow teachers to tamp into the resources of the school and to what extent?

Interviewee: Yes, teachers are allowed but they must go through the teacher coordinator.

Interviewer: What is your role in that?
Interviewee: Just arrange for some funds as you know that the development fund we have to inform the school board members, and then if they give us the money then we continue.

Interviewer: Where does the money for maintaining computers came from i.e. for buying cartridges and upgrading software?
Interviewee: We use to donate every month teachers donate N$ 20.00 and learners donate N$5.00. Just recently in one of the parents meeting we brought this to the attention of the parents whereby we agreed that the next coming year, the N$5.00 should be added on the development fund so that they should pay for once and for all and they were very much impressed in this and they are very anxious to help us.

Interviewer: You talked about two teachers that acquired the ICDL certificates, apart from the two teachers, what is the level of literacy of teachers at the school?
Interviewee: Nearly all the teachers are able to drive the computers and, the only problem is securing these certificates, otherwise with the opening and shutting down of the computers and other activities, all teachers are able to do.

Interviewer: How do you support teachers who want to know more than they currently know?
Interviewee: As I have already stated that, I am learning together with my teachers, I use to just give them some encouragement that let us just work hard since we are the first school in Caprivi region to secure these computers, we have to work very hard that before we reach 2030, at least we should have secured even a start up certificate and they are doing it.

Interviewer: What challenges have you experienced which may hamper the usage of computers?
Interviewee: As I have already mentioned at the beginning , we are faced with a number of challenges like this internet problem, up to now as I already mentioned that we received our computers last year, we are not yet connected which is a very a very serious challenge. The other issue is since we are in a wind area, you get that windows are always closed so it is hot particularly during the summer time, so we are thinking of having an air con but because of the financial issues, we can't afford. And then the other issue as I have already mentioned that our learners starting from grade 8 up to 12 are having access to the computers, the computers are very few since we only have only 20 of them. The other issue is the time limited for our teachers, as they use to have these afternoon lessons, in the evenings they do their preparations; they just only have limited time. And the other issue since we are not connected, the TECH/NA! promised that they were suppose to have installed the programs for different syllabuses but up to now they did not because of internet issue we have yet received that.

Interviewer: What are the financial implications?
Interviewee: We haven't yet experienced that may be it is because we are anxious to have these computers but otherwise everybody month end donates (teachers and learners).

Interviewer: Did you receive any specialised training to prepare you for your role as a technology leader?

Interviewee: Not yet except for this foundation level we received together with my teachers.

Interviewer: Taking you back to usage of computers, do community members ask you to use these computers?
Interviewee: They are very much anxious to join us but they are some restrictions from the ministry, we are told that for now we have to concentrate with our teachers and learners. In few years to came then when everybody is computer literate we can involve the community but as I stated at the beginning, that is our vision to see that the school as well as some community members are computer literate.

Interviewer: Is the anything that you would want to share with me, apart from what we have discussed?
Interviewee: May be on the constraints, when it comes o this issue of internet because were are busy struggling to get some information o how to go for securing internet but up to now we have failed. We have tried the local telecom but they could not help us as well as Rivergades, we could not get help there to. That is why when we had of your research we thought you were going to give us directions.

Computer coordinator transcription for Samusisi S. S. S

Interviewer: Are you the person responsible with computers?
Interviewee: Yes, I am.

Interviewer: Since when are you in charge with the computer lab?
Interviewee: Since 2008, when I completed the seven ICDL modules.

Interviewer: How were these computers acquired?
Interviewee: It was acquired through ETSIP whereby they were requesting schools to apply for it, then that is when it happened that the principal went through the procedures of ETSIP.

Interviewer: What was the role of the school principal in the acquiring this computers?
Interviewee: I think it is partly on few things because she was involved in once the things were advertised but she just told us that she applied. The acquisition was made through and that is when were told that we are under investigation just to find that if computers can not fit at the school, like security and other things involved, whether we have burglar doors and other things, to avoid theft and other things, that is how we managed to get this computers.

Interviewer: What is the vision of the school with regards to ICT?
Interviewee: The school is trying to empower so that as you know that this is a community school, they need to make that they meet vision 2030 so that every learner and teacher are computer literate.

Interviewer: What is the role of the school principal within that vision of having computer literate citizens?
Interviewee: The role of the school principal is to encourage learners and teachers to partake through so that they should be involved in order to meet the vision.

Interviewer: What kind of hardware and software do you have here?
Interviewee: We have a keyboard, the mouse, the monitor, and the overhead projector just for learners if they don't know what to do so that we can be able to assist them. We also have a printer and one of the wireless access points.

Interviewer: Can you briefly elaborate on the specifications of your PCs?
Interviewee: The hard drive of these machines is 250 GB and the other thing which I can specify here is that they are using a network system through the main server.

Interviewer: Were you consulted before the deployment of these computers to the school?
Interviewee: Before the installation of these computers, I think it was done through the school principal's office, me I just saw people coming to install the sockets and other things to be used for the computers.

Interviewer: Were teachers asked for the inputs before the installation of the computers either by the school principal or the Ministry?
Interviewee: Yes, we were consulted, there is one official I remember who came and he

introduced the main purpose of these as the ministry is trying to empower all the teachers so that they should go in the system everybody should be computer literate and assist our learners.

Interviewer: On what issues were you consulted?
Interviewee: We were told that trainers were going to came to the school and after the computers have been already installed in so that they should train us and we became computer literate so that the main purpose for these is to power our learners so that our learners should be computer literate and the resources that we use since in future most of the tasks are going to be done on computers. He was trying to encourage us to complete the course and at the end he was even promising us about getting lap tops when you complete the course and this is how teachers were fully encouraged.

Interviewer: Is there any acceptable user policy?
Interviewee: Yes, I have the computer policy but I think it is not acceptable because it is not for the school; it is the one from NIED.

Interviewer: How are computers used and who uses them?
Interviewee: Teachers, as I said we are a community school, they all use computers and it is mostly used by learners.

Interviewer: Are you saying that community members are also using these computers?
Interviewee: Yes, as I said it's a community school, it means teachers and learners are using the computer lab. They are using it for typing; some of the teachers use it for typing timetables, resources like the ones which I always provide. Sometimes we buy certain software which teachers can be able to use like Encarta and other things so that some of the topic related to their subjects so that they can be able to use that. That is in terms of teachers and learners they use them and some of them came for music but since I found that music can cause virus, I have discouraged them for doing that.

Interviewer: Do you have Encarta software installed on the server or other machines?
Interviewee: The Encarta software is on my lap top which I received after completing the course.

Interviewer: How is the computer usage promoted at the school?
It is promoted in many ways, like I might say in the example of the school principal at the assemble point, the principal encourages learners what is the importance of being computer literate whey they are the university of Namibia, or any other university or institute when they have completed their course. So how is going to be used. So the principal always keeps on encouraging these kids and teachers also as you know the ministry is planning for all teachers to be computer literate, so it means as at a trainer and my assistant we always encourage those learners to make sure that everybody participates in this program so that it helps them for their own benefit. That is how we encourage.

Interviewer: In terms of promoting computer usage, do u feel that what is done is enough or we should still be doing more?
Interviewee: There is still more to be done, as I have already earlier about the internet, we don't have internet at the school.

Interviewer: What do you suggest should be done to promote the usage of computers?
Interviewee: I may say, is to give more information to the people in need for the computers, to tell them that it is important for them to have Information and Communication Technologies in their place. So once that they have the information, I don't think that they will still have negative attitudes towards it. As you know in these days in the world we live in on are working on technology. So there is no way you can make yourself away from these technology which is in our place, so we need to use them so that they help them in future.

Interviewer: Who has access to the computers?
Interviewee: Everybody at the school has access.

Interviewer: Who decides on who should have access to the computers?
Interviewee: That is someone's responsibility, an individual responsibility because I don't want to secede for someone's future, as I have said already this will help them in future so I don't want to have more responsibilities on that. I need to treat everybody to feel that if they want to do a specific thing voluntarily, they do it.

Interviewer: For clarity sake, if it is everybody, you have 20 machines, how do you handle the issue of equal access?
Interviewee: We have decided that those people who have to use the computers, they must pay a certain fee for example the learners they have to pay N$10.00 for registering for a certain module, like they are doing module 2 so they need to pay just N$10.00 for them to be taking part in the computer, for teachers it is N$20.00.

Interviewer: What happens to those who don't/t pay?
Interviewee: Those who don't pay they are the ones that are encouraged to tell that they need these in order to …….that is what we have managed to do.

Interviewer: Just for clarification's sake, those who don't pay the N$10.00 are they allowed to have access of they are disallowed?
Interviewee: They are allowed to have access, but it is only that during classes those who have paid attend classes, but those did not pay there are not refused to have access to any computer, they came at any time they feel like. That is why we have decided that at least we have to include it on the development fund, so that everybody must take part as I have said that our school mission is to have our school community to be computer literate, so next year everybody must use the computer although our infrastructure is too small but we will know how to manage our time table.

Interviewer: Who draws up the timetable?
Interviewee: I am the one responsible for drawing up the time table for evening and afternoon classes. And even the school time table for me is that computers is included on it, like for the private one it is me who is responsible, like special classes for those learners who don't understand when you are monitoring you identify learners who need more attention, I prepare a time table for these special kids.

Interviewer: What is the role of the school principal and the management in drawing the time table?

Interviewee: They are mostly involved because when I draft the time table I consult the school principal in to give the idea why I decided that they are special kids that needs my attention after school after some lessons, that is why the principal is involved and she suggested that it must be done for this period of time or for this period because you know you can not involve all learners during afternoon because it is study time, so you take only 30 minutes of their session. That is how the principal was involved.

Interviewer: Who do you suggest should have access to the computers and for what purpose?
Interviewee: Everybody must be allowed to use the computers because they need the skills, they need to know how to type, they need to know how to use the keyboard, they should know how to use the mouse, so I opt for everybody as I have already mentioned that even those who did not pay that N$10.00 for the learners and teachers if they need to use the computers, they have to use the computers only during the period time, that is where I just need learners who have paid only, but everybody needs to know to develop their skills in computing like using a mouse, keyboard, to know what is a software because even those who haven't paid they will ask me questions that ooh! Teacher can I find out more about that because I am falling to save my documents, so I don't even consider no, I haven't seen your contribution, no I don't talk about that, I just only assist because I know this computers came for them.

Interviewer: You have mentioned a N$10.00 paid by learners and N$20.00 paid by teachers, what are these fees used for?
Interviewee: We agreed that this fundraising should be used for repairing some of the damages, like for example the hardware, if we need to buy a new software, we need to buy cartridge for the printer but currently were are not using that money, we are planning to buy an air con since computers cannot stay in the hot area. So we need to condition our lab. So what is there is the programme for this NETTS they are there for free, so they are going to be supporting if they are any technical problems with our computers. We send our computers there. What I am trying to explain is that we are not using this fund for now, to do that those people are Windhoek are the ones that are going to be helping us with technical problems. The most use for the fund created is to maintain our computers.

Interviewer: Have you experienced any technical problems and how was it solved?
Interviewee: We have experienced one technical problem that is why I am saying that it is not our responsibility to take of our hardware and other things, like one flat screen it was sent to Windhoek and it was replaced with a new one. So it means these people are still helping us for a certain period of time.

Interviewer: Who does communication and coordinates with NETTS Centre?
Interviewee: The school principal, because she is the one in charge of everything, me I only give the problem and she will make some contacts.

Interviewer: What is the level of computer literacy for teachers in using computers?
Interviewee: I may say it is 50%, why so? Teachers are fully committed as I have already told you I am a Mathematics teacher, so it means that every day I give activities to learners and I need to complete so this might be extended to my other colleagues that you will find that they have only 50% uses the computer because most of their time there are committed to some of the tasks. They only use computers when they have tasks related to computers and also

teachers came for help. So I may say it is not 100% as I might be lying, its 50% because they are committed to other things.

Interviewer: Who is responsible for providing training?
Interviewee: It is me and there is another colleague of mine, my assistant.

Interviewer: What is the role of the school principal in providing training?
Interviewee: The role of the school principal is to encourage and informs the teachers to take part in the programs because this program came here for teachers to have fully equipped with technology, so it means that the principal is there to encourage, to give them where they have little bit lineate in performing , if she sees that the teachers are not using the lab, she encourages them during every concuss meeting that teachers we need to do this and this because if this program ends, then we are going to have problems. That is the big role the school principal always plays around.

Interviewer: What are some of the challenges you have experienced as a teacher responsible for computers?
Interviewee: The absence of the internet and air con, because we have problems with the environment where the computers are kept at the end of the day, we may find that our computers are not working.

Interviewer: How have you tried to address these challenges?
Interviewee: We are in the pipeline of solving these challenges as I mentioned earlier that we are raising funds. With the issue of internet, I informed the principal with the issue, soothe principal made some follow up with Rivergede and Telecom but it wasn't successful because f certain barriers and other things like the principal mentioned that they might need a lot of money to use internet because it is too slow.

Interviewer: Is there anything else that you want to share with regards to support of school principals to computer usage?
Interviewee: What I can just talk about here is working with computers is a challenge and it needs my full commitment. As I have already mentioned that I am a Math teacher, so it makes it very difficult too which way to rely because it is asking a lot to help teachers and learners so that they should also complete these modules.

Interviewer: What do you suggest should be done to address that problem?
Interviewee: What I suggest should be done is if they can just employ a teacher or they should introduce it in our curriculum. I know it has been introduced at other schools but I am talking about our school. We are going to have a teacher responsible for Computer Studies. May be the issue I have a concern is about these lap tops we are getting after completing the seven modules, It seems now it is the property of the school, where are my efforts now, because it was not for my efforts will we have received this lap top?

Facilitator: Do you know how these computers were acquired?

Ndombe: Uuuh. I remember last year, I think it was through the principal, I don't know how she got about applying since I am new here, but they had to apply certain schools had to apply and had to meet a certain criteria which I were school did. So it is from TECH/NA and that is how the computers were acquired. It was through the principal, none of the teachers was involved.
Mbufu: I think she is just right, that is how I know it. Maybe the additional information that I want to give, I think we should have applied through NIED, because even the people who came to shade light on how this program is going on were people from NIED, I remember Mr …….. was here to introduce the programme before we even received the computers.

Mutete: Although I am new to the school, I was informed that the acquisition was made through the efforts of the school principal who applied to TECH/NA!. None of the teachers were involved in the acquisition.

Facilitator: To what extent where teachers consulted before the computers were deployed to the school either by the principal or by the Ministry?

Mbufu: actually I am not aware of that but what I just remember is just herd from the school principal when she was announcing the other time saying I was approached by a certain lady in connection with ICT and then she says they want to visit our school so that they can also interviews us and find out if it is necessary they can provide us with some computers and then from there, we were also informed that according to that information is still ongoing. And then as teachers herd that information they kept on asking the question each and every time are computers really coming? People were real excited, and then the principal used to promise I am going to consult the lady and after sometime she gave information that the lady is coming here to survey the place and then the lady came. And then after that she said that they will be some people coming and then that is when Mr …… came.

Facilitator: What do you suggest should be done in order to involve teachers before the deployment of computers to schools?

Ndombe: My suggestion would be as teachers we have a wealth of knowledge, may be if we have been involved from the start we could have put our inputs and instead of getting 20 computer, so if we had been informed in advance knowing exactly what is going on, we would have say may be came up with the strategy in to obtain much more computers which is bigger than this school. So if people involved teachers sometimes so that we can came up with ideas and be part of the process. 20 computers to e honest for a big school like this are tool little.
Mbufu: May be in addition to that you will find that that is why people they says one person's idea is less when you are discussing or brainstorming your of idea and you are alone is difficult to find the variety of ideas, and if we were there may be we could but some more inputs to convince these guys that they cannot just bring few computer, they should bring

more computers because we could bring in ideas that why can't we tell this guys that we are in such a situation so that they can know that these people want more than we want to give them, so may be the way she used to discuss to them it was in another way where they were meant to believe that I think according from what I understand from the school principals that these people need just only 20. According to the other information which I heard from Mr…… was that this was just a start, its phase one, they were plans of saying they needed to at least have three labs, I don't know whether its three or two labs for computers so these is phase one next time they will bring another computers to another lab and another again to another lab. So this is what I heard may be that is why they just provided 20 for now.

Facilitator: Moving to issues of access, how accessible are these computers to teachers and learners throughout the day?

Ndombe: We are very free to use these computers; the only issue that I would say hinders us from using these computers would be that you also have to teach you teach from half seven like now during winter time up to twenty past one, and then you go out for lunch and at fifteen hours you may have lessons up to half past four or so. You real don't get that ample time that you want to have with the computer. If it wasn't for that, the computer lab is always open n the evening, so we have access for computers in the evening. So that is the only time I can say I am free to have access to the computer lab.
Mbufu: As she have mentioned, we are free to use the lab and learners are free to use it as long as there is someone who is monitoring here like the teacher responsible, then when he says may be he is busy at the other side with teaching, then he cannot allow because he is monitoring to see in other words he is managing the place so that any damage he is aware off. So we are free to use it, its only the commitment of teaching because in teaching those who have undergone teaching they will understand that it is very difficult to have ample to me to work with computers. Because although the ministry says we have to work for 8 hours on their part they fail to cooperate with 8 hours. If I may talk of 8 hours, at half past four it turns, and then what about the evening study, who supervises it? We have to came here and supervise the study, if we say and grant that its 8 hours and we have to knock off and do my business, now it will be carelessly here and becomes a problem. No I have to come back because of my cautious.

Facilitator: You have mentioned that you have access to the computer lab, for how long do you have access?

Mbufu: It depends on the free time I have, I have that ample time.
Ndombe: In the evening we can go up to two hours 7 to 9, if the teacher trainer wishes to extend the time we may go up to ten o'clock. Sometimes instead of starting at seven he might be around six o'clock already in the evening. Mostly that is when he is freed. He might be here from six up to ten in the evening. It depends but mostly it is from seven to 9. On occasions it is when he can be here earlier.

Mbufu: Actually time is there, but the only problem I find is that they are few, most of the learners and teachers want to use them. But it is very difficult to use them at the same time. The time you want to come here you find that all computers are occupied by learners, that means you have to say that maybe I have an urgent document that I need to type and then they will excuse you for that moment and then you type and finish and then they occupy it. It

is a problem, which is why we needed to have more.

Facilitator: What do you suggest should be done to improve the issue of access?

Mutete: My suggestion would be, back when I was at the college we had a system where you had to sign in for example you came at eight o'clock you were only allowed to use it for one hour and then you need to leave it for others. If even you are not finished unfortunately you really had to move and then book for another time. So if we had bookings like each person uses it for an hour and the other person uses it for another hour. That would be my suggestion.

Facilitator: Who keeps the keys for the computer lab?
Mbufu: The computer teacher trainer.

Facilitator: What happens in his absence?
Mbufu: He has an assistant, there are two. So he used to sometimes if they are all out, they have trust in other teachers if they are committed, there are all out ,then they have to entrust it to a specified teacher who can assist.

Facilitator: In case you want to use the computer lab, what procedures do you normally follow to have access to the computer?
Ndombe: As a teacher, say for example I have a free period and I want to use the computer, I simple came to the teacher in charge of the computer lab, I speak to him. If he is having a lesson say for example, I speak to him and explain to him that I really need to do this in the computer lab if you can entrust me with your keys, I won't touch your server after that he might came and see me here or I take back the keys.
Mbufu: normally that is how we used too. We use to come talk him whether he is teaching somewhere there, we just go there and say I wanted to do this task in your computer lab and now I see you are busy, can you entrust me with your computers and he says no problem and gives you the keys.

Facilitator: What kind of support do you receive from the school principal with regards to usage of computers?

Ndombe: I would say our principal is one of the most encouraging people. Every Monday we always have a concurs meeting and Fridays. There she normally encourages us that we are so luck that we got these computers we did need to pay anything, so lets us make use of the, lets us use the resources that we have, let us learn how to use them, let us incorporate using the computers into our lessons, she is very encouraging even during the assembly when we meet learners on Fridays mornings she talks to learners to encourage them to pay the necessary funds that are needed to allow them to use computers because the world is changing. She tries explaining these things.

Mbufu: In addition to that, she is more encouraging because I remember last time last year we were one of the schools who started with the programme of ICDL, we were doing ICDL, May when we received these computers, so we started learning all the teachers were involved. This year is when she tried to encourage the learners to join also and then she said because we realised that we need to have some funds in order to keep aside for maintenance

of these computers so that we can have them for a long period. That means we encourage learners to be paying a certain fee and teachers paying a certain fee for computer maintenance and then with that she realised that as she was checking through she realised that some of the learners don't normally use the computer lab and then she came up with the idea of saying maybe we should introduce this to parents so that on the school development fund, parents should add something so that with learners it becomes compulsory for them, so that they can came and participate in the computer programs. So she is so encouraging, she is willing very much, she is to supporting on the issue.

Facilitator: Still on the issue of usage, you as teachers how do you use these computers? For what purpose?

Ndombe: normally I came here to type tests, mark sheets may be they are learners I need to enter marks, I just came here I use the computer. Since we don't have internet, if we had internet I would be using it much more but other than that, I am just using computers for those things.
Mbufu: just for typing, because we were still preparing to at least develop an idea of may be using them in teaching presentations like using the power point presenting into slides, it was also our plan that we get used to computers and then we start preparing some of the things. But now currently we just use them for typing our materials, teaching aids and so on. So if there was internet although I have just heard from the teacher in charge that there is promise of connecting internet, which may be in future. Then that way I think we will be using it for searching for additional information because we are using textbooks and textbooks are just information sources, so we can still find more information from internet on different topics that we teach.

Facilitator: How supportive is the school principal in encouraging teachers to use computers?

Ndombe: Like I said before she is very supportive, I think she is the one that made even last year during the ICDL training programme, you know they were some teachers who had a very negative attitude towards learning this. She really tried her level best to encourage us saying that people we are living in the world where technology is taking over, so if we are left behind then we are going nowhere, so we real need to take advantage of this so that at the end of the day not that does it benefit us individual but help us in our classroom.
Mbufu: It is true because even now they are some teachers that have completed the seven modules of ICDL but she still tries to encourage some remaining teachers to complete. Sometimes she used to say that the time that you are free you should visit the lab and practice so that you take the tests and get the ICDL certificate. I remember when we use to write here and some teachers use to fail, she used to feel very bad and she would say aah I was expecting. She would come here even if we are writing on Saturday; she would drive all the way from her home to support us.
Mutete: And she also to get involved and she would also write to set an example for us to say if this was the first time for me to use a computer and I am sitting for this test, why don't you, who already knew the basics?

Facilitator: In the absence of internet, do you have other educational software's like the Encarta software installed on your computers?

Ndombe: No, they are no educational software's,

Facilitator: Moving to issues of teacher computer training, what is the level of computer literacy level of teachers at this school?

Ndombe: last year when we started with this training of ICDL, only a few of the teachers had used the computer before and they knew the basics and the majority it was the first time so during training it was quite fun as some people didn't/t know how to switch on the computer and switch it off. It was a very learning experience last year, a very real learning experience. But the training real helped, people can now type, those that did not know the basics now have the basics, those who were on basic level have now moved to advanced.

Facilitator: You have mentioned issues of monitoring the usage of computers being done by the teacher assigned to take care of the computer lab, to what extent is the school principal involved in monitoring the usage?

Mbufu: Actually, the principal is the overall supervisor of this computer lab, normally she uses to pop in as usual like the way she use to check on the normal classrooms and teaching activities. She use to came and see how the learners learn in the computer lab, and then she goes because I remember sometimes she used to came here and find us, she checks, ask questions on cleanliness, ask the computer coordinator what are the problems that you are facing then he goes to give the report, at one stage I herd him saying I have spoken to madam …….in Windhoek. I see that she is very close, she is monitoring.

Facilitator: Moving to challenges, what are the barriers that you have encountered that might prevent the effective use of computers? These are obstacles.

Ndombe: The only issue might be electricity issue sometimes, because we are a rural school, so every now and then they will be disconnection.
Mbufu: I don't know whether this is more relevant to the question, in my case I use to find that its time allocation to my work like in this case when sometimes I feel that I have to work on the computer but I have batches and batches of things to mark, I have to mark, I have to prepare, I have to attend to whatever. So many activities and many responsibilities hinder me from having ample time on computers, so it is something that is hindering me from attending to computers the time I want. That is like an overload of work.

Facilitator: Too what extent has that issue of you being overloaded been addressed?

Mbufu: actually on our level since I joined the teaching profession normally when you overloaded and give an excuse to the manager and say you are overloaded ere, normally is like uniform response that they normally give, they would say you are teacher, you are a soldier, you have been trained for that, you have to do the work. The other issue thing which brings the overload is, I normally brings this in workshops I am specialising in Math and Physical Science, so I have realised that instead of them understanding that this teacher must be given at least one line say Math Grade 8-12 instead of double because you became overloaded, so that they can bring another teacher, they give excuse that you are the subject king pin that you have to take care of this although you tell them you are overloaded, preparations' all that, it is as if you are just giving excuses.

Facilitator: Just in conclusion, if the usage of computers at this school is to improve or more is to be done, what do you suggest the school principal should do?

Mbufu. Part of it I think, may be this time she use to monitor by coming, in future she must have a program so that she can exactly check and monitor the level of learning of both learners and teachers that at least how are the learners learning like the way she normally does in the classrooms because she use to have some results like this learner is performing at this level and this learner is at this level. That scale she has to know.
Ndombe: The principal should make sure that the suggested money to be used for maintenance of computers is paid by each parent so that all learners are allowed to have access to the computer lab and do ICDL, as the current arrangement where learners are asked to pay per month is not working as some learners do not pay although parents do give them money.

Facilitator: Why haven't you touched issues of security?

Mbufu: Although in the first place the Ministry representative touched on the issue of security saying our rooms should have burglar windows and a burglar door, I think the principal should still work on that as we are currently using padlocks and they are not safe. The school should consider installing an alarm system.
Verified to be what was discussed

Focus Group for Chwanga Secondary School

Facilitator: What is the vision of the school with regards to ICT?

Nasilimwe: No, considering that I only arrived two months ago. I don't know what the vision is.

Facilitator: What about the rest of the group?

Mesho: Our vision is to see that in five years time all our teachers and learners are computer literate.
Vision two: To have all computers connected to internet, so that teachers use electronic dictionaries and other sources.

Facilitator: What do you see as the role of the school principal towards the realisation of these visions?

Mesho: The role of the school principal is going to be liaising with other stakeholders to purchase more computers. Also he is also going to communicate the vision to the teachers and learners.
Nasilimwe: The principal will have a very big role in ICT since he is the head of the school, he will have to decide whether to introduce computers studies as a subject. Because at the moment we don't have that subject at our school, they will have to introduce it. The first step that the principal will have to take is to work with his colleagues and decide on bringing the subject itself that will start with Grade 8 up to 12.

Facilitator: How accessible are computers?

Mesho: Teachers were divided into the departments when we received these computers; the department heads use to come and learn what programs are on the computer. The department heads then would seat design the program and train others. These computers had internet connectivity, so it was accessible to teachers. But the problem was that when we received these services (internet) it was not free. The school ended up having a huge bill which they could not access.
Nasilimwe: With regards to accessibility of learners, too much of anything becomes a problem in the long run. Once there is too much accessibility, it becomes a problem as they became dependent on the computer and then they might end up misusing. So accessibility is a bit restricted so, the restrictions which are there are for management purposes. But never the less they have access to the computer lab.

Facilitator; If you have to use the computers, what procedures do you follow to have access?

Sifu: You seek permission to use the computer lab.

Facilitator: You seek permission from whom?

Sifu: You seek permission from the teacher in charge as you cannot just walk in and use the computers.
Mesho: Procedures are very important in any organisation; you cannot run an organisation without procedures and policies. For a big school like this one where we are having a lot of learners and a lot of teachers, all of these people want to use computers, so if we open access to everybody without control. You are going to see that every time we are having problems. To prevent problems, you must identify one person who must control the computer room. That person is the supervisor who should see to it that the network is working, if there is a problem he will know. Secondly, computers are free; each particular user is created passwords, which controls unnecessary use. This controls unnecessary usage in case of internet and emails.

Facilitator: What is the role of the school principal in determining who should have access to the computers?

Nasilimwe: Any learner at the school with the intention for using computers for learning purposes has access. The principal is the overall overseer; if users are misusing the computers the school principal will burn or discipline such kind of learners.
Mesho: The principal is a very important person herding the school; his role is to monitor the usage whether they are being used. And to monitor the person who is identified to take care of the lab, whether the person is doing the right job. In the first place he should see to it that the person who is identified must came up with the program which is effective where teachers and learners are being trained. And to see to it that the school is benefiting from these computers which are installed.
Sifu: The principal as the overall person in charge should see that the programs are implemented. In addition, his role is to support the teacher responsible in acquiring software's needed to smooth access to the computers. He should make sure that the programs are available to the users in the school.

Facilitator: Moving to issues of usage, who uses the computers and for purposes?

Sifu: In most cases the computers are used by teachers and learners. The teachers use computers in their daily planning that is to supplement our planning. When these computers were connected to internet, teachers use to use the computers to search for information to enrich their preparations. Learners are using the computers for computer literacy. As my colleague have already mentioned, computer studies is not offered at this school, so at least learners should be taught computer literacy.
Nasilimwe: The first priority goes to teachers and learners. As my colleague have already mentioned, the teachers use computers to enhance their teaching and to improve learning.

Facilitator: Still on the issue of usage, you have emphasised enhancing learning which I believe has to do with searching information on internet, are these computers also used for administrative purposes, teaching or recreation.

Mesho: The computers in the computer lab are for supplementing teaching, for presentations of lessons. They must be used for research purposes, and for presentation. Administrative computers are in the administration block. My other colleagues have mentioned that this computers should be used be used by learners and teachers only. That should not be the case,

if we have to attain Vision 2030, members of the community should also be accommodated. So the school should accommodate the community members i.e. train members of the six school board members.

Facilitator: What is the role of the school principal in promoting the usage?

Nasilimwe: The role of the principal is to fuel the usage of computers. He advocates that computers are fully operational, working to their full capacity at all times.
Sifu: I support my colleague. The role of the principal is to sale the idea of using of computers. More especially when teachers and learners having morning briefings, he should encourage the two groups to use the computers to their maximum. This is legal or accepted use. They should not use computers on their illegal private members. Also, the school should invite parents in parents meeting who are computer literate to visit the computer lab. Secondly on promotion, the school principal can use the media (radio or televisions) to promote the usage of computers. The school can introduce courses for community members and fund raise from that.

Facilitator: Seeing that you have already moved to the next level, which is training. What is the computer literacy of teachers at this school?

Nasilimwe: The majority of the teachers at this school are fresher's, meaning we have just joined the teaching service from higher tertiary institutions, during our years of training ICT literacy was heavily integrated, so I can say the majority of teachers are able to drive the computer.
Sifu: As my colleague has said we the young generations have been exposed to ICT at training institutions. Most of us can do the basics on the computer.
Mesho: I am informed this deployment is an initiative of the ministry of education; I can say the level of literacy is not that high, it's only very few individuals that are literate. As my colleagues have already mentioned, this is a big school. You cannot just bring 20 computers for a school with 500 computers. If you divide the computer ratio to the enrolment that means it is 50 learners and two teachers per computer. That is not enough; we are supposed to have computers in the staffroom to be used by teachers for typing question papers. I would say three quarter of teachers lack skills.
Nasilimwe: on literacy, I would suggest the ministry should organise ICT workshops to refresh those teachers that have been trained while they were at professional studies.

Facilitator: As teachers what are the barriers which might have affected you from using computers?

Mesho: One thing is the access to computers. As I have already indicated the computers at the school are not enough, and we don't have money to buy new computers. At least they should help teachers half way to purchase computers. You know with computers you learn once you have your own computer.
Nasilimwe: One challenge that I have noticed is that some of the computers are not compatible to some programs. For example, these computers are working on Windows XP, while Microsoft has introduced Windows Vista. Some programs, the newly designed meant for Windows Vista won't be compatible to Windows XP.
Mesho: Another challenge is lack of professional expertise in the area of ICT. The Ministry

should identify and employ people who have skills to assist teachers in the region. The Ministry should not just give the responsibility of on the school principal to nominate a teacher who is just is interested without the necessary training.
Sifu: Another challenge is lack of peripheral devices, such as projectors, scanners. With the deployment like this, the ministry should deploy all the peripheral devices to the school.
Mesho: Another challenge is the facilities. In projects of this nature the ministry should have at least built computer labs that take to 40 or 50 participants. This room is to compact.
Nasilimwe: In support of my colleagues, another issue is about the about equipments like chairs. The school was not provided with chairs hence learners have to come with chairs from their classrooms.

Facilitator: Having identified all this challenges what is the role of the school principal in addressing all this challenges as we cannot expect the ministry to address all this challenges?

Sifu: Most of the challenges identified are beyond the level of the school principal, but however, school principals can meet the Ministry halfway by buying some of the peripheral devices that are not available like scanners.

Facilitator: Is there anything that I have left out which relates to the roles of the school principal in supporting the usage of computers that you would want to share with me?

Mesho: We just want to thank you for selecting our school as your research site.

Interview with the school principal for Kazizila Combined School

Interviewer: What is the vision of the school with regards to ICT?

Interviewee: Currently our school is without a vision. It is only now when I came in office when I tried to come up with this idea that let us came up with the vision, but for now we have a mission for the school and no vision. So for now teachers have submitted and we are only waiting for the school board for final approval, may be after finalisation but all in all what we are saying is to incorporate ICT through out our curriculum. That is why we are encouraging each and every teacher to make use of the computers in the computer lab so that whatever subject that teacher is teaching they should use ICT.

Interviewer: How do you see yourself within this vision that you have set to the school board for approval?

Interviewee: My role as the head of the institution would be to make sure that everyone from the teacher up to the learner incorporates the vision, that is my role is to make sure that the vision is attained, so that is what I think.

Interviewer: Just in brief, what kind o hardware and software's do you have here?

Interviewee: I might say we might have everything on hard wares; we have the monitors, printers, scanners, the main server, things like that. For the software we have children's Encarta and all this programmes that are required for learning like the dictionary.

Interviewer: Do you have an acceptable user policy?

Interviewee: The school is without a user policy, what we have is verbal policy which is not yet documented. So we are also still do that, you can see we still have a lot of challenges, the vision and the user policy.

Interviewer: How did the school acquire its computers in the computer lab?

Interviewee: They were some visitors from the National Assembly who were visiting schools and after visiting the school according to the needs of the schools they donated some computes. After that donation, there was a need for training the teachers, five of teachers and some from other schools were sent to NIED for training. The same people that went for training were given a questionnaire to which they gave the needs of the school. That is how we received the second donation from TECH/NA!

Interviewer: What was the role of the school principal in acquiring these technologies?

Interviewee: The school principal role in the acquisition was to spearhead the acquisition after finding out that there was a need to integrate ICTs into teaching.

Interviewer: Who uses these computers and for what purpose?

Interviewee: The computers are used by all that is this school, everyone who is in this school.

Mostly we encourage teachers that at least if not always, once in a while the specific subject they take their learners there. May be they access the information on the topic they are busy with in their lesson on Encarta. And also to tell them how useful these machines are, but all teachers and learners are encouraged to have access to computers.

Interviewer: You have mentioned all people at the school; does this include school secretaries and cleaners?

Interviewee: Yes it includes the secretary and cleaners.

Interviewer: Are these computers used for teaching, administration, communication, research or recreation?

Interviewee: We have got some that are used for administrative purposes like those ones in the secretary's office and the other ones in the staff room. The other ones in the computer lab are specifically used for teaching and learning. And also if they are many teachers who are using computers in the staff room, some of the teachers can go and use those in the computer lab. In most cases those in the computer lab are used for teaching and leaning. With the communication, we are still trying to figure out the internet line, so we have requested assistance in that regard so that learners and teachers use computers for communication. And also that will help teachers that are studying to download information on internet, in other words they will also use computers for research purposes.

Interviewer: What is your role in encouraging teachers to use computers?

Interviewee: What we normal do is like everybody have ……. and like in a week, I keep the computer keys and observe how many teachers ask for the computer lab keys, if I notice that few teachers have requested for the keys during that specific week, then I will tell teachers in the morning briefing meetings that let us make use of these computers. So lets us also try to improve our skills. We normally motivate them during the morning briefing that we have if need be. That is where we also emphasise about the ministerial ICT policy, as it talks about ICT integration in all subjects. But currently it is only three or two teachers that are constantly using the computer lab.

Interviewer: How is the usage monitored?

Interviewee: The usage currently is monitored by the specific teacher who requests for the keys. The care taker teacher who received troubleshooting training normal checks the lab after a specific teacher has used the lab to see if everything is in place. How I monitor which teacher is using the computer lab, I monitor them by keeping keys. For such each time they need to use the computer lab, they have to get the keys from me. That is how I monitor the usage.

Interviewer: Who have access to the computers?

Interviewee: Everyone have access (teachers, learners and the school secretary).

Interviewer: Who decides on whom to have access to the computers?

Interviewee: The management decides, but even though they decide they should go back to the staff so it is like everybody decides. But overall I am responsible.

Interviewer: Briefly how does the management decide?

Interviewee: if we observe that this group of people do not use the computer lab properly or may be when they leave they don't lock, that is when it cames a concern, can we allow this situation to carry on? So then we may decide on suspending that group from using the lab.

Interviewer: Is there a time table that shows who should use the lab?

Interviewee: That we don't have. It is just like an initiation of individual teachers. Like I said for now they are only three teachers who use computers as such there is no need for a time table. What we need to do is to synthesise teachers to use computers then all everyone is interested then we will have to do the time table. Like some of the teachers use to say I don't have basic knowledge on how to use computers, so that is a hindering factor stopping them from using the facility.

Interviewer: What is your role in determining of who should have access t the computers?

Interviewer: My role like in most cases some of these machines a very delicate, so which means if somebody is not very much skilled in using computers so my role will be to attach someone to help that person in using that machine. That is why we put a notice on the door of the computer lab "No learner is allowed to be in the computer lab without the supervision of the teacher". That is at the same time since our computers are not having an anti virus protection, we discourage the use of memory sticks.

Interviewer: How long do those who use computers have access to them?

Interviewee: As long as they want to stay for now since there is little demand for the computers.
Interviewer: Who handles maintenance issues?
Interviewee: The school is responsible for that. For any damage the school will attend to that.

Interviewer: What is you role in the maintenance?

Interviewee: In fact I don't have much role there, I just authorise. Like if they experience a problem they came to me we have got this problem and we have identified this technician then I authorise them and tell them to go ahead.

Interviewer: To what extent are teachers allowed to tamp into the resources of the school to attend to maintenance of the computers?

Interviewee: That depends on the urgency of the matter but in most cases if it is within the limit e immediately give a go ahead.

Interviewer: I saw you have two sets of computers, one set you acquired through the National Council and the other through TECH/NA!, have you experienced any technical problems

with the computers acquired from TECH/NA!?

Interviewee: Yes. When they came they just assembled few of the tables and installed few of these computers. After that they left to other school in the region, within that week I tried to contact them, they told me they were still at Sangwali, from there Simataa, Kanono. Then we took almost three weeks and then we made follow ups with the regional office to the education planner, and he gave us the number to which we called. It was when we telephonically consulted them when they gave us directions on what to do. Like now if you try to switch some of those computers, they don't connect. Others they connect but all of a sudden they disconnect.

Interviewer: You have mentioned that you had to go to the regional office and call TECH/NA, who initiated this?

Interviewee: I took the first step, when I came I was told that I would be in charge of the computer lab as the school principal.

Interviewer: Where does the money for maintaining these computers came from?

Interviewee: From the school development fund.

Interviewer: What is the literacy level of teachers in using computers?

Interviewee: The level differs; we have other teachers that have completed this CECS course and others who have level 1 but no ICDL. But currently we are identifying some teachers who would want to do ICDL and the trainer will be coming soon.

Interviewer: How do you encourage teachers who would like to know about computers?
Interviewee: Normal we just encourage them to enrol with these other institutions particularly this ICDL, like now we have this training inline. So we encourage all teachers to enrol as a school so that we use these facilities.

Interviewer: What are the challenges that your school is faced with that might hamper the usage of computers?

Interviewee: In the first place is lack of knowledge or computer skills by teachers. Some others have the basic ground like typing or accessing Encarta but when it comes to troubleshooting we have a problem. The other problem is maintaining the computers as you have seen in those boxes with dissembled parts, so we don't know if those parts all there. So we need to take an inventory of all this parts so that we can discard that are not working.

Interviewer: Did you receive any specialised training?

Interviewee: No.

Interviewer: What type of training do you suggest you should receive?

Interviewee: I would suggest ICDL and the other one that covers basic troubleshooting so

that I may know how to go about addressing the problem.

Interviewer: Are you suggesting that you as the school principal would be doing troubleshooting at the school.

Interviewee: Not necessary, but with other teachers that are interested but as the school principal, I should take the lead. And I should also not be cheated to things like this one is very expensive or this one is no longer working.

Interviewer: In conclusion is there anything that you want to share with me with regards to your supporting role as a school principal which was not covered.

Interviewee: The only thing I would say is that this field is still new especially here in Caprivi perhaps if you could get us someone who is skilled more special with ICT integration. May be if you link us with that person.

Interviewer: Is it for the whole region or for the specific school?

Interviewee: I think for the whole region it is going to be difficult, the best way is to link with our school and then we can take it from there.

Interviewer: Are you the person directly responsible for computers?

Interviewee: Currently I am just taking care simply because we were not provided with the computer teacher as such. So it was a mandate given to me by other teachers.

Interviewer: For how long have you been taking care of these computers?

Interviewee: I have been taking care of these computers for two consecutive years now.

Interviewer: I see you have two sets of monitors so, which means they might have been acquired in different ways, could you briefly elaborate how they were acquired?

Interviewee: The first other monitors which you see that looks to be old were acquired through as the request of the school that was made in 2005 to the National Council when we saw that we needed to assist our teachers in terms of having the information regarding to Basic Information Technology usage in teaching and learning situation. So the Deputy speaker of the assembly as well as the National council came about providing us with this donation and they were provided through the embassy of China, and then the embassy of China donated them to the National Council and the National Council and the National assembly delivered the materials to our school. And these other new ones that you are seeing, the HP ones, these are the donations from the Ministry of Education, after realising that the school participated in the ICT training programme that was conducted at NIED three years ago, so they identified our school as one of the pilot schools to be provided with this systems that you are seeing currently.

Interviewer: You have mentioned that the first set was acquired through the National Council and National Assembly. To what extent was the school principal involved in the acquisition?

Interviewee: Effect what was done by then, they was high need that was raised by teachers to the principal, so then latter on the principal requested the Regional Office in that should they happen to have some materials that were laying idle because previously this school was a white school, they were old computers which were here, so they were of no use currently. So we needed to replace those computers with the modern software's and hardware. So this is how in fact they were brought to the school.

Interviewer: Would you briefly describe what type of hardware and software you have available.

Interviewee: According to the hardware's, we have the central processing unit which are pcs, printers, we have got also scanners together with the server which is the supplier of the whole as well as the power supplier. These are the hardware's that we have. Under the software we have got a program which is running through NETS project, which means it is the software for teaching program that is incorporating all subjects. That any teacher who has got anything that he has to do in terms of assignments, class activities, projects, they can came in here and make use of that software to retrieve the information. Say for example on the teaching

learning process, to enhance teaching to learners.

Interviewer: You talked about teachers making use of these computers to retrieve information, who uses this computers?

Interviewee: It is any teacher who feels she or he has a need to sought of like use the presentation for his subject matter using the media, then he or she is allowed as long as he obtains the permission of the school principal to get the access as he is also giving some BIT teaching lessons so that this programmes do not collide. But in most cases teachers are doing it at all times in the afternoon.

Interviewer: You are saying that it is the responsible of the individual teacher to make usage of the computer lab.

Interviewee: Yaa, with the proper arranged program, if I have got a period that needs to present either its about Geography, Social Studies or History, any evidence that I will require the use of Encarta software and other programs, I have to make a program so that by that specific time I should inform my learners to came in here so that they should be divided into groups to retrieve or either present that topic accordingly so that it can be visual.

Interviewer: You have mentioned that these computers are used by teachers, are they also used by learners?

Interviewee: In fact when I am saying they are used be teachers, it is not specifically on the interest of teachers but on the interest of learners to unlock their teaching and learning process.

Interviewer: Let’s move to the usage, what do people who visit the lab use the computers for?

Interviewee: When learners are coming for BIT programmes, what they do is they are taught to be computer literate. They are given some basics on how to use computers themselves independently in case if they say for example have got access if its over the weekend where the school is closed, they go to the libraries and other things, they should have that at least knowledge to operate the computer and see how they are able to use it to their advantage.

Interviewer: At the moment, is it used for computer literacy classes?

Interviewee: Yes.

Interviewer: You have mentioned that these computers are installed with some software’s like Encarta, do learners and teachers use these computers for research purposes.

Interviewee: Like the Grade 10s and 9s when they are given are project, they are normally urged to come in the computer lab. Go in some software’s and get as much as information pertaining to their assignment or project they are given for further information to have got good quality that will award them with good marks.

Interviewer: Are members of the community allowed to use these computers?

Interviewee: Unfortunately we do not open access to the community.

Interviewer: Is there any acceptable user policy?

Interviewee: The acceptable user policy does not existing because why previously the one who was accountable was our former principal who has left the school. He is the one who was regularly using it, so upon his departure I just took over as the care taker to enhance learning. That at least is assistance should be given to learners those who need access to the computers. Currently now we do not have a policy that has been drafted at the school.

Interviewer: Who keeps the keys for the computer lab?

Interviewee: The keys are being kept by the principal himself. Whenever there is a programme he is approached and then the room is opened.

Interviewer: He is approached by whom?
Interviewee: He is approached by any respective teacher who wants to use the computer lab.

Interviewer: Moving to issues of time tabling of the computer lab, how is it done?
Interviewee: The time table which is there, on our time table we have BIT, so during that time of BIT, the school principal has to came and open the computer LAB and learners have to came into the computer lab pertaining to their class group that have got that BIT programme at that specific time.

Interviewer: You talked about teachers came to use these computers, do they do it individually or they bring their class?
Interviewee: Normally it always conducted with their learners, with their class groups. Lets say for example if its Mathematics, if its Life Science, or either its Business Management or Geography, then the respective teacher is the one who should came here because he is the one who knows what type of information does he or she want to direct the learners to concentrate at.

Interviewer: For how long do learners and teachers have got access to the computers?
Interviewee: it depends on the period; currently we are running at 40 minutes per period which means it only period per period and then unless if its properly arranged in the afternoon like after we have got classes in the afternoon, its then a teacher can have access to as much time as his work requires learners to take part in that programme.

Interviewer: Moving to issues of usage, how is the computer usage promoted within the school?
The computer usage it is not that effective I would say in the sense that the Ministry does not provide or did not create this BIT programme to be like teacher who is specifically employed to conduct or teach BIT programs at the school, so what you find is that its only those teachers who are literate enough to be able to make use of the computers and to present their teachers teaching and learning programmes with computers who are able to make use of that. So this is a problem.

Interviewer: In other words those without computer skills are left out.

Interviewee: That is the question which is there; you will find that they are hesitant to come here unless they came with a colleague who will be able to assist.

Interviewer: What is the role of the school principal in promoting the usage of computers at the school?
Interviewee: That one is a very interesting question, the role of the school principal even though it will sound like responding on behalf of someone, the role is supposed to see to it that every teacher is computer literate so that being computer literate teacher we are incorporating ICT in our teaching/ learning programmes. And as you can see information is currently flowing through technology, so the usage of technology in teaching and learning situation is very important because it is a resourceful media that can make teaching and learning to be more effective.

Interviewer: If I may go back to that issue of computer usage promotion, you mentioned that it is not promoted.
Because of the lack of the policy, that is the thing that makes it not to be much very biding to teachers. That is why I have even mentioned that some are hastate to came to into the computer lab, to make use of the computers.

Interviewer: Moving to technical issues, who handles technical issues?
Interviewee: Well I am responsible for handling technical problems, specifically on the troubleshooting only. And also a bit of some minor problems say for example if there is a problem I can be able because I got sought of like a preliminary training at NIED two years ago.

Interviewer: What is the role of the school principal in handling technical and maintenance issues of computers?
Interviewee: In this case you will find that the role of the school principal is of negossive because he is new person he has just assumed some month ago he has not yet established himself properly, he still relies on my inputs here and there to see what type of programmes himself would want these computers programme or either lab to function and how he would want to develop his own vision regarding the usage of these computers. And also at the same time how does he want this programme to be promoted to be effective to the incorporation of teaching and learning skills.

Interviewer: To what extent are funds made available for acquisition of ICT equipment?
Interviewee: with funds the school does not normally provide provision for that because of the expensiveness of the exercise and the collection can not be able to sustain.

Interviewer: what is the level of literacy of teachers in using computers?
Interviewee: Well, at this institution I would say 85% of the teaching staff have got basic computer skills, sought of like knowledge of using the computers.

Interviewer: Who is responsible for providing training to teachers and learners?
Interviewee: We had a program that was given to our school through the VOC teacher who was from the United Kingdom who was sent through by Microsoft Company to assist teachers to have the idea, through that we had a programme that was running every afternoon to at least give knowledge or basic skills to teachers to be able to know how a computer and

what type of software's. And few were awarded with certificates through that programme.

Interviewer: What is role of the school in determining teacher's training?
Interviewee: That one is also a little difficult question because it is a directed question to the principal but from my own perspective the principal himself with such a well equipped lab he was supposed to have created initiative on his time table programme to specifically point out and allocate a specific teacher who should be accountable specifically for BIT programmes and who should be able train other teachers. And who should be able to enhance the usage of computers during BIT periods when learners are coming into these periods so that they should be self sufficient with computers.

Interviewer: Who monitors the usage of computers?
Interviewee: Currently now I would say there is no supervisor as such, as I have indicated that it is me who is taking care of the machinery, the equipments and computers. But the supervisor I would say currently we do not have. That was supposed to be part of the computer programme that runs and then you assign teachers that should conduct BIT specifically with other relevant subjects that you are offering.

Interviewer: What do you think the principal should be doing in monitoring the usage of computers at the school?
Interviewee: I think the most important thing if I could be a decision maker independently, I could see to it that he has, he takes much responsibility to promote the usage of computers to a very effective extent, in the sense that the person was supposed to be appointed within the teaching staff, to take responsibilities of computers, at the same time to always report damages that occurs at the computers lab and the needs together with the financial implications that goes along with upgrading. And also the allocation of training programme to others teachers.

Interviewer: What are the challenges or barriers that you have experienced which can hamper the usage of computers at the school?
Interviewee: The challenges is that some certain software's and the internet which is not available because there is no money that is put aside for the operation of the computer lab. To allow learners to have access to internet as well as teachers to have access to internet to get further information that will help them to have a resourceful centre that can move out from the text book setup. And also at the same time the lack of training also the know how of operating the machinery is a set back to some of the teachers as well as few learners.

Interviewer: You have identified few challenges, what has been done to address some of the challenges that you have identified?
Interviewee: With the internet issue with the budgetary that I submitted I have indicated that internet should be connected as such funds must be made available as to connect these computers.

Interviewer: To what extent was the school principal involved in addressing these challenges?
Interviewee: Not very much since he is a new person he ha been in office for only two month, so I think this are the challenges to which he has to draw his own personal programme to see to what extent he would want to be involved in assistance of those few people who have an idea and who have a will in making use of the lab and how himself he would want and he

understands the usage of ICT in the teaching and learning.

Interviewer: What do you suggest the school principal should do to address some of the identified challenges?
Interviewee: I will suggest to him may be in the next academic year he should request for appointment of a teacher who should be able to provide BIT programme at the school and the same time he will serve as the teacher trainer, as well as coordinate this programme at this institution.

Interviewer: Lastly is there something else that you would like to share with me with regards to computers and the school principal's support.
Interviewee: May be the only thing that I would want add is that may be in the near future the Ministry itself they should see to it that where there are some piloted projects, they should see to it that these projects they have initiated should not just die the natural death, they should be followed up to see how productive the projects are, or are they operational or they are dormant. If they are dormant they should be researched to find out why they are dormant. What problems did the institution encounter, because money has been spent and it will be seen as a waste of government resources.

Interviewer: Are you the teacher that is responsible for computers at this school?
Interviewee: Yes, of course.

Interviewer: What is the vision of the school with regards to ICT?
Interviewee: since we are looking at achieving vision 2030, as the technology is improving in nearly all our daily lives which means it is important for learners to have access to computers, hence simply when you look in our currentualy we have this Grade 10 dropouts, at least when a grade 10 drop out have access to computers you see that they have that prosperity to work in any company so far they can do anything to work on the computer spreadsheet, database, and power point, he can use computers . I don't think such learners can have problems working with computers in future. So our vision is to equip all learners with ICT literacy skills

Interviewer: Is there any written school vision?
Interviewee: Unfortunately, suppose may be it may be there because by now currently we are looking at vision 2030. When it comes to computers also just because of that vision, each and individual learner have to have access to computers. you find that even these leaner's that are not doing computer studies they usually came and disturb me they want to learn computers, they used to complain 'Teacher we also want to learn about computers, how can you leave us behind when the world is becoming modernised'.

Interviewer: What I want to know is your school is supposed to have an ICT, that is the road in which the school want go, or what you want to achieve. So what I what to know is if there is any written vision.
Interviewee: Currently, there is nothing written. May be we are just looking at that broad vision of 2030 which is not broken down.

Interviewer: Since you don't have any written vision for the school, I am going to do away with the next question which was supposed to be what is the role of the school principal within that vision? Moving of the next question what kind of hardware do you have here?
Interviewee: The hardware's, currently my school is very much unfortunate I had a server which served as you can see I used a Local Area Network, but unfortunately it was stolen by these people as you see we are leaving closer to these people. Leaving closer to these people is a problem always. It was stolen. Later on I tried to find someone if he can try to fix a ring network ort of a ring whereby each computer can serve as a server, unfortunately I am running short of the storage, the storage capacity of these machines is too small. Currently I have everything, the hard ware is there. You can see I have system units, mouse, monitors, keyboards, everything is in intact.

Interviewer: What are the specifications of these machines?
Interviewee: The hard drive is 54 GB which is too little.

Interviewer: And the RAM
Interviewee: Ooh! Now I think I am confusing these things, a RAM is supposed to be 54 GB may be. Not knowing specifically the size of the hard drive>

Interviewer: Do you have any acceptable user policy?
Interviewee: Of course, as you can see I have got rules, hence whenever you are working with learners at least they must be rules applied on that because learners currently by now, when you look in there those keyboards are no longer just because the teacher who taught this subject before was so lineate, he could even allow learners moving one keyboard to another machine, most of the keyboard mouth are broken. Suppose we have even applied for new ones although the school has to buy new ones. Now there are some rules applied, which restricts the learners. I am strict I try to control my learners.

Interviewer: What has been the role of the school principal in drafting those computer lab rules?
Interviewee: Currently, when you talk about computers, I don't know the way I am going to explain it whether I am out or. We differ institutions we have here, he is a principal but when it comes to these computers he have got no knowledge of what is happening here. Even computer access is a problem, now currently by now as you can see things are to slow even to work on those computers so that learners start working on the, it is to slow. May be he regards these computers as not important machines although it affects me as during examinations the practical part is also included, me I am just teaching the theoretical part.

Interviewer: Apart from the school principal, was any member of the school management involved in drafting the computer lab rules?
Interviewee: I will say no, simply because as I said some of our staff members do not have access to computers. I just only decided on myself because I know how important these machines are and how these machines are to be handled. I just decided to put strict rules myself as a computer teacher.

Interviewer: Just for clarity sake, were these rules discuss in any of the staff meeting?
Interviewee: Yes and they were endorsed there.

Interviewer: Do you know how these computers were acquired?
No, although it was just like I was told, by the time I came here, these computers were already here. These are from donor countries I hope so. They were donated to another school in Okahandja luckily to find that school had computers already. That is how they were brought here. But I don't know if they came from a local company within Namibia or outside country.

Interviewer: How are computers used and who uses them?
Interviewee: The computers, every staff have access to the computers as long as they stick to stipulated rules. Learners also have got access; they can only use the computers at that time when it is computer period and they are some stipulations, I have put on a time table whereby they have to came and do some practice. It is not that they can use computers at any time, without a teacher it will be to dangerous, you know learners are always careless, only few of them usually can take care of the machines.

Interviewer: You are saying teachers and learners are using computers, can you briefly explain how they are using them. Isn't for research, administration, teaching and learning or for administration?
Interviewee: Currently by now, for example we have Encarta software installed in these

computers, where special learners came looking for answers within the Encarta once they are given an assignment they have to use these computers for those purposes. Teachers for example they have access to the computers, those who can type they can came and type sort of question papers, time tables and other staffs like that.
Interviewer: Apart from teachers and learners, do community members also use computers?
Interviewee: Currently by now I have not stated working with the community, the help was there, and we could help the community and the school could make a lot of fund from within that. A lot of people want to know how to type.

Interviewer: How are computer usage promoted within the school?
Interviewee: With my learners here, hence it is important they have to learn computers of course. Let me just say like learners who re doing Accounting, I am trying to encourage them to use computers at least for example they are doing things like income statement and balance sheet, in order for that income statement and balance sheet to sound easier for them, of course they have to know how to enter the information within the computer using the spreadsheet. And of course they have to work on how to apply formulas there. That is how I am trying to promote the usage of computers.

Interviewer: Does the school principal encourage teachers and learners to use computers?
Interviewee: I will say no. let me just be brave enough and say no. because when I arrived at this school there was a problem, each and ever individual were interested in this lab, but one person was very strict. You could here some people say he might be jealousy. When this lab opened, it even attracted learners to came in, they were interested in this subject but latter on they were discouraged by the big outs who are on top. They would say learners are no longer studying, each time they are in the computer lab. Which was a very big discouragement?

Interviewer: What do you suggest should be done to encourage the usage of computers?
Interviewee: Of course I like it; most especially learners from Grade 8 to 12 have to use computers. They must have even basics those who are not doing computer, access to computers is better. It will help hence those people are still pressing, they are still going ahead facing higher institutions, at least that little basic they had whenever they are at the higher institutions, I don't think they will face any difficulties there. At least even to start the computer, to go through some programs, to know how to use those programs, I think it will help them.

Interviewer: Let's talk about teachers, what should be done so that they use these computers?
Interviewee: of course I like it, teacher also has to know how to use computers. Its only that maybe time affecting them because I was very much troubled immediately when I came here, simply work a teacher would came here rather than demanding the secretary to type for them, they would came to me and say can you type this for me this work. It's like the other side I am affected I was suppose to in class but now I have to sit and help that teacher. Its better for a teacher to have access to the computers when its coming to drafting school work, time table and learners assignments, they can do that work on their own on computers.

Interviewer: Who have access to computers?
Interviewee: Some teachers have got access to computers, and my learners the Grade 10 currently now have got access to computers, grade 9 have got access to computers, only grade 8 who were very much unfortunate because by the time they were supposed to do their

practical's the server got stolen. Now to help them, I just use my lap top to show them look at this because we are towards exams. May be it will help.

Interviewer: Who decides on who should have access to the computers?
Interviewee: The principal was supposed to decide but unfortunately he is not that kind of person. Me I am under, should it be me I am encouraging people to have access to computers at school, it's like I am against with his rules. Although he was the person that was supposed to be powerful to use this lab as a weapon both learners and teachers, searching for assignments on computers, research and so on, working on internet.

Interviewer: Let me take you back to the issue of hardware's, you have mentioned all hardware's that you have but you haven't mentioned any thing about internet connectivity. Briefly tell me what the situation with that is.
Interviewee: Currently we don't have although it was in process for the learner's sake. It was in process. That is the only thing which is affecting me at this school, you find that those people who don't know the importance of these machines, and they are just taking the word simple machines. That is the only thing that is affecting me.

Interviewer: For how long do those people who have access to the lab have access?
Interviewee: Each period its about 40 minutes, if it's a double period then its 80 minutes. And still I have decided to give them extra time during study time, they could came here and do some practical's.

Interviewer: You are talking about learners that are doing computer studies, what about those learners who are not doing computer studies as a subject?
Interviewee: Only during their free periods, free periods they usually came and I help them. Currently by now some can switch on the machines, they have that little access.

Interviewer: What do you suggest should be done so that at least everybody should have access to the computer lab?
Interviewee: Of course something was supposed to be drafted and I will lay that one on the principal. He was supposed to lay something there. Just starting from teachers and those learners at this school who are not doing computer studies, he was supposed to draft something for those learners so that also and teachers can came and use these machines in order for them to have that access to the machines.

Interviewer: Who handles maintenance issues?
Interviewee: Since these are school properties, whenever I run shot of materials i.e. cartridge is finished, I just take it to the principal and he will know what to do.

Interviewer: To what extent are funds made available to acquire ICT equipments?
Interviewee: Maintenance issues are done by the school itself. When it comes to cartridges', repairs if anything happens all those are the roles played by the school principal, he has to see to it that he calls a technician, if I run short of cartridges', he has to place an order that side.

Interviewer: What is the computer literacy level of teachers at this school?
Interviewee: That is an interesting question, we are facing are very big problem when it comes to teachers most specially those teachers who happened to be at big schools that had

no computers, of course they are facing a big problem, that is why you find that our secretary when she goes home is like she is sick, lots of work. A simple work that was supposed to be typed by the teacher, that work is passed to the secretary. At least the training must be there. Of course I support it. Teachers have to be trained how to use computers. Again it avoids the disturbances; I was very much disturbed when I came to this school by the time I knock off I could not sit down, I had to go home and sleep. Lots of work, by the time I was supposed to relax someone would come saying can you do this for me Mr…….. and I didn't have time to rest. So at least even typing, that little literacy of typing doing simple work on computers that little training should be there.

Interviewer: Are you saying that the majority of teachers do not know how to use these computers?
Interviewee: Yes

Interviewer: Lets talk about who should be responsible for providing training to teachers?
Interviewee: Of course the Ministry of Education would have to play a role in these areas to help its teachers, it is not only that whenever they are training these teachers, it helps once he knows even how to use a projector that makes it simple when he is presenting the lesson in class rather than wasting time writing on chalkboard. Teachers would end up using projectors and it will end up making their work simple.

Interviewer: In other words at the moment there is no computer literacy training being offered at the school to teachers?
Interviewee: Currently there is nothing, they were only just given this ICDL. It only passed at once. And within a short period of time this people don't have access to computers, I was just for a month and learning a computer is not a simple thing that can be learned within a month. The duration was to short at least if the duration was a full year or two years.

Interviewer: Now you are talking about ICDL training, tell me as with ICDL training at the end you have to write up a start certificate, how many teachers got even a start up certificate for the first four modules?
Interviewee: At this school no one; although most of the teachers were involved almost seven but no one received a certificate why? Time, the training time was to short and it's a lot of work.

Interviewer: what type of training do you think should be given to teachers and by whom?
Interviewee: I think that could sound very simple to the government; so far there is a teacher who is teaching computers at that school, it will be simple for the government rather than acquiring someone from outside to came and train the teachers or teach them. In that case the government may not waste time looking or hiring teachers from outside.

Interviewer: Who supervises or monitors the usage of computers at the school?
Interviewee: That is the work of the computer teacher

Interviewer: What is the role of the school principal in monitoring the usage?
Interviewee: As he is the head, I came under the principal, whenever the machines are here; they are being controlled by the head, I can only monitor this place when I am with my learners. But anything that comes what is important has to came through the head.

Interviewer: What challenges or obstacles t you have experienced that might affect the use of computers at the school?
Interviewee: Learners are problem, more especially when we talk about using secondary storage devices whereby its difficult to control the learner. You may say apply the rule 'No learner is allowed to came in with a private CD or memory stick and so on' but it is quite very difficult to control learners in such a way. At that context now I am talking about computer viruses. Most of the viruses are being carried in such a way, now its very difficult to control the learners. For example I might get committed that side, here they are playing or listening to this American music from their memory sticks without realising that is how virus are passed. At the end of the day, I will experience the virus.

Interviewer: How did you address this challenge?
Interviewee: Simple it must be one of the written rules, like for example no learner is allowed to eat or drink in the computer lab. As I said also when it comes to secondary storage devices, which must be the rule.

Interviewer: How was the school principal involved in addressing the challenges?
Interviewee: Yes the principal was involved most special in looking for the stolen server. We tried by all means although it is difficult once the machine is stolen it is difficult to recover it. Currently now the principal is still disturbing the security company that was on duty when the server was stolen, the company is the one that is supposed to replace the server. Even with these secondary storage devices, he is also pushing me very hard that Mr…… don't allow learners to came with any private device in your lab because that is going to affect your computers later on within the short period of time, you will soon came here saying your computers are not working properly.

Interviewer: What is the vision of the school with regards to ICT?
Interviewee: Well the vision of the school if it was possible we would have computers in our class, that we would use power point projectors.

Interviewer: With the vision of the school, I mean currently what you would like to achieve in terms of ICT?
Interviewee: We would want to have everybody literate in computers.

Interviewer: How do you see yourself within that vision of having everybody computer literate at the school?
Interviewee: I see myself as one of the beneficiary.

Interviewer: How as the beneficiary?
Interviewee: I will be computer literate and able to help others.

Interviewer: Would you briefly describe what kind of hardware and software you have at this school?
Interviewee: Since I am not computer literate I wouldn't be in a possession to describe them to you.

Interviewer: Is there any acceptable user policy for computers?
Interviewee: May be you should explain what you mean by user policy.

Interviewer: With user policy, I mean guidelines which are documented that would guide you and other users on what type of equipments that you have, how they should be used and what is regarded as not acceptable.
Interviewee: In terms of computers, at the moment we don't have.

Interviewer: How did the school acquire these computers?
Interviewee: They were donated by a company in Windhoek.

Interviewer: What was your role in the acquisition of these computers?
Interviewee: Our role was to advertise ourselves that we wanted computers, we went through the bank Standard Bank, latter on we were then given this computers by that company, not knowing whether their were contacts with Standard Bank and that company, we don't know that.

Interviewer: In other words, you are saying you wrote a letter seeking donations.
Interviewee: Yes

Interviewer: Who uses the computers?
Interviewee: Learners

Interviewer: What about teachers?
Interviewee: Teachers were supposed to be using them, for example they were to go under training, and somebody came from the United States of America, a volunteer who was

training, none of the teacher qualified and up to now we don't know what happened. We wrote the tests but up to now we are not informed from what we were doing.

Interviewer: You said these computers are used by learners, for what purpose are they using them for.
Interviewee: It is for one of their course, one of their subject's computer studies. They are only used for teaching and learning.

Interviewer: What is your role in promoting the usage of these computers at the school?
Interviewee: My role is to make sure, I have to already, and that is why we requested for these computers, my role is to make sure that these computers are used at the school. Means encouraging each and every one of them to participate, but that should be done particularly the teachers when they have free periods, but unfortunately they are not doing so.

Interviewer: How is the usage of those computers monitored?
Interviewee: Its monitored although we don't have a policy through our structures, the teacher, the HOD, if there is anything that goes wrong with those who are using them particularly the teacher concerned or the HOD for commerce then reports to us.

Interviewer: Who have access to these computers?
Interviewee: It is learners.

Interviewer: Who decides on who should have to computers?
Interviewee: That is determined by the subjects the learners are taking, it is not everyone who takes that line. It's only those few who are doing commerce or who take commerce as part of their package. Only the few of them.

Interviewer: Are you saying that those learners that are not taking computer studies as a subject have got no access to the computer lab?
Interviewee: For now, yes they that have got no access.

Interviewer: What is your role as the school principal in determining who should have access?
Interviewee: For now, is to make sure that I am by the guided by the package in the school. That is when not me myself who should decide on who takes computer but a committee decides on who should take computer as a subject based on their skills as to what happens is that they are tested and those who seem to understand what is going on they will be allowed to continue.

Interviewer: How long do they access to them?
Interviewee: Almost the whole day, any time they feel like except when they are busy with other subjects, that is when they are not allowed to use the computers. But the whole afternoon they have access to computers.

Interviewer: Moving to the issue of maintenance of computers like upgrading software's, buying cartridges, how is it done?
Interviewee: We buy them ourselves through the school development fund.

Interviewer: What is your role in the maintenance of computers?
Interviewee: Well that is where I mentioned that my role is to make sure that computers are repaired, but if anything goes wrong the only unfortunate part is that we do not have any experty who should fix our computers. So but my role is to make sure that these are functional.

Interviewer: Technical support, who do troubleshooting?
Interviewee: That is a very big problem we are experiencing that we are encountering. To be honest we do not have any support.

Interviewer: In terms that there is something that needs to be done in case of trouble shooting, where do you go?
Interviewee: We simply have to hire someone.

Interviewer: What is your role in hiring someone?
Interviewee: My role is to write a submission seeking for someone to, inviting who ever has got know how to came and repair our computers. My role is particularly is to make sure that I write to invite someone to came and help us with our computers.

Interviewer: Do you allow teachers to tamp into the resources of the school if there is a problem that have to do with computers?
Interviewee: Yes, last time the computers had a virus problem, we had to hire someone to work on that from the school development.

Interviewer: How do you feel about spending on these computers?
Interviewee: It is not our liking that we have to spend on these computers, that is not our liking. We would have liked that somebody maintains our computers. We are very much unfortunate that there is no one who came to our aid.

Interviewer: You have mentioned that some of your teachers received training from the American volunteer that was at your school, what is the computer literacy level of your teachers?
Interviewee: Very low that is why may be we did not get our certificates.

Interviewer: Are there some teachers who want to know more about computers at your school?
Interviewee: I would say yes.

Interviewer: What has been your role is supporting those teachers who want to know more about computers?
Interviewee: We have had meetings inviting them to do computer literacy for some many times now.

Interviewer: What are the challenges or obstacles that your school has experienced which may hamper the use of computers?
Interviewee: The first one is theft, our server the main heart of our computers got stolen, so far up to now it has not been recovered. It has not been bought. Nothing has happened so far. So that is the major problem here even these computers that are here, each time that go to

sleep you have your heart bumping that you will find them stolen. There is no proper security. There is nothing. The other thing is that that is also a challenge is not having someone repair them is a challenge, a very big one. Thirdly, not having an air con is also a problem. During summer our computers are very much affected by the heat. So all these are challenges for the school.

Interviewer: You have mentioned security and air cones as some of the challenges, how have you handled the first challenge so far?
Interviewee: Well, we have put in some burglar bars but it seems they are some expertise in breaking those burglars any time, so now we are left with no other option but to made those that are broken. That is what is there. Now the other thing is that the security guards that are there, to me it seems they are the ones that are breaking in, so this company if it was me I will not recommend it to guarding the school. I am putting a recommendation already. Because to came in our computers were stolen and they are still stolen up to now, when they were investigated it was found that the same security guard who was on duty was the one who stole them. And now it means that we are in a big problem that we don't even know how to handle.

Interviewer: You are recommending that schools should not hiring security companies to save guard their computers?
Interviewee: No, I mean that we should not be hiring this specific security company, we should be hiring a better security company that are properly trained.

Interviewer: Still on the security issue, do you think that apart from hiring a security company they are still some mechanisms that the school can do to address the problem.
Interviewee: We are thinking of having an alarm, this has been registered with our directorate and we are just waiting for their response.

Interviewer: The other challenge you mentioned was the conditioning of the lab, what steps have you taken to address that issue?

Interviewee: Well, we have written some letters requesting the directorate if they could help us with an air con, we have not yet received any response. And we have even invited them to came and see our lab.

Interviewer: Although you haven't mentioned this as a challenge but for me I see it as a challenge, you have mentioned about the low literacy level of teachers in using computers, what do you suggest should be for teachers to became computer literate and integrate computers into their teaching?

Interviewee: What should be done in that regard is that we should have people to came and train us as a school, so that we became computer literate. As for now we are very much behind.

Interviewer: These people they should came from where?
Interviewee: Well they can come from companies.

Interviewer: Is there anything else that you want to share with me which can be beneficial to

some school principals out there?
Interviewee: Well I would say if it was possible to have computers in each and every school, since we are driving to the 21 century, each one should be computer literate.

Interview with Ministry of Education official at NIED

Researcher: What was expected from school principal before the deployment of computers to schools?

MOE Official: First there was a letter that went out to schools and this work was actually spearheaded by the ICT in education initiative. The letter went out to school principals regarding an e-readiness survey, which was circulated to determine the status of all the schools in terms of their current ICT infrastructure, current infrastructure in the form of space available that could be utilised for the computer lab and the nature of space available, if they were two or three classrooms that were available and that could be converted into computer labs. Were these having security bars at the door as well as burglars at the windows? Then there was an issue of power or electricity, telephone line. So this survey had a series of different aspects that were going to give to the ICT in Education Steering Committee the status of the school regarding the e-readiness. In other words if the school had power in place, and the school had some space within its facility, such a school depending on whether it was a previously advantaged school, or the disadvantaged school would feature within the priority list for roll out. We are using the pro poor approach to rolling ICT infrastructure in schools as well as training. If a school was identified as not having any space, not having electricity in place for example, another process was going to follow to ensure that this school gets the supporting infrastructure such as power, so that in the subsequent roll out this school became available in terms of readiness to receive the computers and so forth. School principals in the first place were to complete a survey and have it returned to the ICT in education project office called TECH/NA!, so that on the bases of that, a plan was actually put in place to provide that school with the appropriate support it required.

Researcher*:* At the installation of the lab, what was expected from the school principals?

MOE Official: Usually school principals are the overseers; they are the custodians of all the resources that are available at their disposal. I am mindful of the School Indicators of Performance Standards that the Directorate of Programme and Quality Assurance had actually developed and trained school principals on. One of the key functions of the school principal is to ensure that there is provision of resources for school and hostels. These resources imply human resources, physical resources, finance resources and resources that are relative to the running of the school hostel, if the school had a hostel. In terms of the expectation of the school principal after the role out of the computers, school principals were expected to manage the resource. They were also informed that they had to safeguard these resources; they had to ensure that they have a system of providing security over the goods, whether it is in the form of a community school security being utilised to guard the facility overnight and also ensuring that there is maximum security in the form of putting burglar doors and windows in the rooms where these facilities were being installed.

Researcher: How are these principals prepared for these roles that you have identified?

MOE Official: As part of capacity building to enable them to understand the importance of these resources, school principals are also part of the candidates that are to receive training in ICT literacy as well as ICT integration for educators. The key role of school principals being

trained in ICT literacy is to ensure that they also receive the tools and they receive the understanding, knowledge and skills that are required for them to utilise ICTs in their work. There is a component of ICT for educational management which is emphasised in ICT policy for Education in Namibia, having being trained in ICT literacy school principals will also be provided with a school management software that would be utilised for time tabling, issuing of school reports, the management of learner assessment results and so forth. You would see that when school principals are trained in ICT literacy they would begin to value these resources in terms of how they are utilised in their work and how they are utilised by teachers. The second type of training that school principals would also receive to scale up their understanding of appreciating the importance of these tools is the ICT integration, which is basically is about equipping educators with the understanding and skills which are essential to utilise technology for the purpose of teaching and learning in the classrooms. Principals in Namibia have teaching responsibilities, in addition to these teaching responsibilities they are expected to serve as instructional leaders who give intellectual stimulation and motivation to their teachers to utilise these tools. Part of the issues that school principals have been informed is the issue of training covering all of those areas. So then finally when they act as custodians of all the resources that the school has, they are able to both ensure that these resources are protected and they are utilised for the purposes of enhancing teaching and learning. And they are secured; so they can last for a long period of time. This training is ongoing. Our approach is that, first schools are identified, and then deployment of computers and internet connectivity follows. After this onsite training in the area of ICT literacy takes place where the candidates (teachers and school principals) are trained on ICDL. Once they have certification, they are actually ready to start with the second training which is the ICT integration. So when ICT integration is rolled out, it will target those schools that have received computer labs as well as teachers have already been trained in foundation level ICT literacy. Because they don't need to acquire ICDL in order for them to be trained on ICT integration, so as long as they have the foundation level which is the basic level of our National ICT certification curriculum then they will be ready to be trained on ICT integration. So the integration part has not yet started but the literacy part has started. And most of the school that have been deployed, school principals often chose to be in the cohort to receive training.

Researcher: Who is offering this training?

MOE Official: The ministry offers the training in the sense that the training is funded by the ministry, there is a tendered process where suitable companies are procured, and they make bids. The right one is offered to give this training. But of late we also noticed that because of the limited numbers of trainers who would go in the field to train teachers, we have realised that in order for us to scale up the training the ICT section under general services in the Ministry of Education has to also came in and provide training. So this guys has also been given training in addition to the training that teachers receive from a company that is appointed. Second, the ministry is now looking in the possibility of using former teachers to train educators in ICT integration. In this case most of the ICT companies that are offering training will not qualify. So you see here the ministry providing the human power necessary to provide that type of training. So you say that currently the literacy training is the combination of using private companies who tenders, these companies are monitored by the ICT section under general services that has the expertise. Don't also forget the fact that the Ministry of Education is a certified ICDL partner, in other words the ministry will be able to

provide training and they will be able to get assessors who will go and conduct assessment. So that unit instead of training, it has been heavily involved in providing assessment so after the trainers complete their work, the ministry of education as a certified ICDL assessor sent in to assess the teachers who participated in the training and then they get the certificates.

Researcher: What is expected from school principals in terms of technical support?

MOE Official: We have a module that is called first line technical support which was also developed as part of the training package. So what is expected after the ICT literacy is completed, then the first level of technical support from the school level point of view will be provided. The minimum of two teachers per school will be trained on how to do troubleshooting and also how to resolve technical aspects that may challenge them to use these equipments effectively. They will also be trained on the channel that is in place, where they can call upon the National Educational Technology Service Support Centre. There is a 24 hours 7days a week toll free number that teachers can actually use if the teachers who were trained on technical support are unable to resolve the problem. If they call this toll free number they will be able to be given online telephone support on how to solve the problem. So this is part of the roll out, there is a module on first line technical support, what I am not so sure off and this is where Johan was going to provide you with a better answer, is whether that first line technical support training has started.

Researcher: What are the guiding tools which are in place that will assist school principals in monitoring the usage of computers at schools?

MOE Official: We have a guideline on ICT integration which was developed by a project in ICT which explains what ICT integration is about, what educator's got to do, what benefits they will get. That will be part of the package that will be left to schools after they have received an ICT integration course. We are also thinking of developing some specific module on managing and utilising ICTs in schools, the guidelines for school principals or the guidelines for schools. That will be a very specific guideline that would actually ensure that principals are able to go back to it and actually see how teachers are using ICT. But what we have in place already is the fact that once principals have been trained on ICT integration, they will walk away from that training having attained the knowledge of how teachers are to use ICTs in teaching and learning. That is one of the reasons why principals have to under go ICT integration training, it is not only for them to benefit on how to use ICTs in teaching and learning, but also for them as instructional leaders to actually get excited about it, so then they are able to ensure that teachers are occupied in using it. So from that, another intentional outcome of the training is to have principals natural walk around the schools, visit teachers classrooms, observe how teachers are using it. Right now we have tools in schools that PQA has developed to monitor the external school indicators of performance standards through a process of self evaluation, where a teacher uses a specific tool to self assess how they are attaining their curricular goals. In the same instant the school principal would be able to use that external evaluation form which is used also to came and observe how the school is meeting the indicators, how are the teachers meeting the indicators. So the school principal can easily adapt that to out of common sense and utilise it to get feedback on how the school is doing as far as using ICT to reach the curriculum goals.

Researcher: What financial implications does this project have on schools?

MOE Official:: Financial it means that schools we really have to identify resources that they can actually get in order for them to ensure that school resources are secured, ensuring that windows are ok, burglar doors are functional and if the school decides to have an overnight community security guard maybe pay that person from that fund. These are some of the works which will involve money which schools will actually absorb on the local level.

Researcher: Who will take care of buying cartridges?

MOE Official:: The school receives the budget allocation from the ministry on the regional office level; partly I foresee that schools will forge some of these costs from the school development fund, and also be supported by the regional office to procure these resources. But as far as technical support, when they are breakdowns in the use of these machines, the schools will send the computers to NETSS and NETSS will fix that, there is no extra costs. That has been one of the most very challenging areas ensuring that technologically tools work, and if they don't work, you identify the reliable place, a point where they are sent, the machines are fixed and sent back to schools on time have been a challenge before the creation of TECH/NA!. But with the creation of TECH/NA, the NETSS has been born which makes it possible now and very practically to have this kind of support provided. In fact one day I was working at the college of education, colleagues there told me the server was struck by lightning on Monday, Tuesday they sent server to NETSS in Windhoek, by Friday the server was back. That was great, in the past machines would go to the private sector, get fixed there, sometimes you never here from the private sector and machines were never returned.