THE ROLE OF COMPUTERS IN TEACHING AND LEARNING AT TSHEDZA COMPREHENSIVE PRIMARY SCHOOL

by

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DEDICATION

To my husband Michael, with gratitude for providing me with the opportunity to fulfill my dreams. My precious gift from God Mulalo, Jacobeth, the twins, Takalani and Tshifhiwa, and their younger brother Michael junior.

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ABSTRACT

The increasing use of information technology in education around the globe has raised important questions about the relationship between the educator and the computer. This study examined the educators' perception of the role of computers at the school, in teaching and learning, and their perception of the impact of computer implementation at the school in comparison with worldwide implementation.

The data was drawn from several educators from a single school with varying perceptions about the role of computers at the school who participated in focus group interviews and allowed participant observation of the researcher at their school.

Although all educators expected to benefit from computer implementation at the school, they felt that computer implementation at the school did not benefit them to their satisfaction due to lack of access to the computer room, relegation of computers to a single subject of computer literacy, lack of exposure, limited programs, and the context of the school (management) which were viewed as barriers to successful implementation of computers at the school.

The study concludes that for educators to implement the use of computers in a constructive manner, they must have opportunities to (experiment) learn about computers (knowledge and skills) in a supportive climate that promotes staff development.

SINOPSIS

Die toenemende gebruik van Inligtingstegnologie in die opvoedig wereld-wyd, het baie belangrike vrae oor die verhouding tussen die onderwyser en die rekenaar na vore gebring.

Hierdie studie ondersoek die onderwyser se begrip van die rol van rekenaars in die skool in die skool onderrig en leer, en hulle begrip van die benadering tot die gebruik van rekenaars in die skool in vergelyking met wereldwye uitvoering en implementering.

Die data is onttrek van verskeie onderwysers uit 'n enkele skool. Verskillende konsepte oor die rol van die rekenaars by die skool is in fokusgroep-onderhoude en deelnemer waarneming deur die navorser versamel. Alhoewel al die onderwysers verwag het om voordeel te trek uit die rekenaarimplementering by die skool, het hulle gevoel dat die implementering daarvan hulle nie genoegsaam gebaat het nie omdat daar beperkte toegang tot die rekenaarkamer is, en dat die gebruik van die rekenaars gerelegeer is tot die aanbieding van rekenaargeletterdheid.

Die behoefte aan blootstelling aan die rekenaars, beperkte toegang tot programme en die wyse waarop die skool bestuur is, is beskou as versperrings tot suksesvolle implementering van rekenaars by die skool.

Die studie het tot die gevolgtrekking gekom dat onderwysers rekenaars slegs op 'n konstruktiewe manier kan implementeer, as hulle geleenthede het om te leer oor en van rekenaars (begrip en vaardigheid) in 'n ondersteunende klimaat wat personeel ontwikkeling bevorder.

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CHAPTER ONE: BACKGROUND TO THE STUDY

1.1 OVERVIEW OF THE STUDY

Computer technology is widespread in today's world to such an extent that it is viewed as an indispensable tool that has become part of the daily lives of people, as it is used in homes, offices, shops, banks, hospitals and many more other places (Carter,1993, Capron,1995, Picciano,1994, Shelly, Cashman, Waggoner & Waggoner,1992)

Information technology has also found its way into education and the basic concepts of the South African education system are being replaced, as it has been realised that the challenges towards education cannot be solved anymore within the existing educational framework. Computers, especially when they are linked to networks, have the potential to change everyday classroom practice dramatically (SAIDE,1998). However, Jordan and Follman (1993) argued that computers alone cannot restructure schools, neither can schools successfully restructure without incorporating computers.

This implies that the successful use of computers as educational tools depends on the efforts of educators to integrate them meaningfully in teaching and learning (Burke,1986, Muffoletto & Knupfer,1993).

In addition, the use of computers in education will inevitably place new demands on educators as key/principal agents of all successful innovations to get involved in preparing learners for living in tomorrow's world, by not ignoring the technologies which already are fashioning the human environment (Muffoletto & Knupfer,1993).

The impact of computers as productivity tools in the educational setting is evidenced by Forcier (1996) who identifies three main applications of

computers in educational settings, which are: computers as management tools, computers in teaching and learning and computers in educational research.

However, it appears that computer use has been limited in educational environments in South Africa, especially in black rural communities. The obstacles limiting the potential impact in these areas appears to be lack of microcomputers in schools and institutions and lack of electricity and other infrastructures (Fourie & Van der Westhuizen, 1998).

This brings a very important question to the fore: Will educators in black rural communities, who traditionally have had little or no contact with computers adapt and accept this technological development? Adapting to meaningful computer use in teaching and learning is a process that is stimulated primarily by the perceptions of the educator about this new tool (Berge & Collins, 1998).

Research has shown that the effectiveness of computer use in the field of education is dependant on the perceptions and feelings of educators and before educators can adapt to computer use as an effective tool for teaching and learning, they must given enough exposure to computers so that they become familiar with them before they can use them in teaching and learning (Berge & Collins, 1998, Francis, 1994).

1.2 RESEARCH PROBLEM

The use of computers continues to increase in all spheres of life (Burke, 1986, Griffin & Bash,1995). Educators as such are faced with a challenge of preparing learners with skills relevant to the information society of the 21st

century (Seymour, 1993).

However, a large body of literature indicates that the issue of computer technology and educators is one of the most distracting ones because a number of educators who report little or no use of computers for teaching and learning is still considerable (Perkins,1992, Moursund, 1989, Office of Technology Assessment, 1995)

It is evidenced by Wetzel (1993) that most educators report that they hesitate to use technology and do not feel prepared to integrate it into their instruction when working in their different schools.

A similar point of view is expressed by Paprzycki and Vidakovic, (1994) that "educators are more hesitant and less likely to embrace computer technology than other professionals".

In light of the context presented, it is clear that the use of computers in teaching and learning in black rural schools may prove to be very unsatisfactory, However, the presence of computers continues to increase in a number of schools in South Africa. At Tshedza Comprehensive Primary School in the Northern Province, a number of computers have been introduced. This raises the question as to **how do educators at Tshedza Comprehensive School perceive the role of this technological development in teaching and learning?** Understanding the educator's perception of the role of computers may impact on the implementation strategies, and is therefore important.

In order to answer the above main research question, the following sub-questions will need to be investigated:

- What roles can a computer play at a school?

- How does the implementation of computers at Tshedza Comprehensive School compare with the implementation of computers in education worldwide?

- What is the impact of computer use on the tasks of educators and learners at Tshedza Comprehensive School?

- To what extent are computers contributing to the improvement of teaching practice of educators at Tshedza Comprehensive School?

1.3 AIM OF RESEARCH STUDY

The main focus of the study will be the investigation of the perceptions and experiences of educators about the role of computers in teaching and learning at Tshedza Comprehensive Primary School. This will include accessibility and availability of computers as well as the educators' knowledge of computer use. Therefore in light of the research aim, this research study aims to:

- Determine what roles can a computer play at a school.

- Determine how does the implementation of computers at Tshedza compare with the implementation of computers in education worldwide.

- Determine the perceived role of computers in teaching and learning by educators, at Tshedza Comprehensive Primary School.

- Determine the impact of computer use on the tasks of educators and learners at Tshedza Comprehensive Primary School.

- ❖ Determine the extent of improvement that computers are contributing towards the teaching practice of educators at Tshedza Comprehensive Primary School.

The findings of the study may be used to educate the management as well as the staff at Tshedza Comprehensive School about the nature of computers as instructional tools in teaching and learning.

1.4 CONTEXT OF THE STUDY

The study will be conducted at Tshedza Comprehensive Primary School. Tshedza is the only Comprehensive school in the whole of Thohoyandou district area and it is 3km from in Thohoyandou township. The school opened in 1998, it is a public school that is comprised of middle socio-economic class learners and serves the communities around it. It has classes from grade R to grade seven with 483 learners and 13 teachers.

1.5 CLARIFICATION OF CONCEPTS

The following terms are briefly explained here because they appear throughout this research study:

1.5.1 PERCEPTION

The term perception has been explained because it forms the basis of discussion in this research whereby the perception of educators who are the focus of the study is taken into consideration.

According to Pettigrew and Akhurst (1999) perception refers to the meaning that people attach to the information that they receive through their sensory

receptors, which are sight, sound, touch, taste and smell. For example, people transform sounds into spoken words, or patterns on a page into written words.

This point of view is also supported by Forcier (1999) who indicates that perception is one's acceptance of sensory stimuli, given meaning based primarily on past experiences. The most sensitive stimuli for the acquisition of knowledge are visual and aural senses and one's sensory experiences result in perception, which in turn are organized into understanding.

1.5.3 EDUCATOR

The term educator has been used in this study instead of teacher because it has become the term that is gaining favour in recent years in the educational setting. The South African Council for Educators established as per government gazette No. 16037 of 1994, an educator means any person who teaches, educates or trains other persons or who provides therapy at any school, technical college or college of education or assists in rendering professional services or performs educational management services provided for by or in a department of education and whose employment is regulated by educators' employment act of 1994 (SACE,1994).

Van der Aardweg and Van der Aardweg (1988) on the other hand view an educator as a person who demonstrates authority, trust, expertise and understanding. He/She is more than a mere teacher of a subject but seeks to impart to the learner qualities that will enable him/her to reach responsible adulthood successfully.

1.5.4 COMPREHENSIVE SCHOOL

The term Comprehensive will be used throughout this research study and is explained in order to make it clear that it is not just any school but a school that caters for learners of all grades, that is, from grade R to grade 12.

Learners of all these grades are managed or supervised by one principal together with his/her staff members. However, educators may separate according to classes they teach but being in one institution.

1.6 ABBREVIATED RESEARCH DESIGN

The research design that was followed in order to collect, record and interpret data in this research study is briefly described below. A complete description of the research design is found in chapter three.

1.6.1 APPROACH

The research approach that will be used in this research study is qualitative because data will be collected in the form of words about human experiences rather than numbers. Words have a concrete, vivid, meaningful flavour that often proves far more convincing to a reader or another researcher (Miles & Hurberman, 1994).

In this particular study the qualitative approach will be used because the research focus consists of writings about educators' experiences and perceptions at Tshedza Comprehensive School about the role of computers in teaching and learning.

The method to be used in this research will be **case study**. Case studies comprise a very important and useful means of gathering information in qualitative research. Case studies focus on one instance of a particular phenomenon with a view to providing an in-depth account of events, relationships, experiences or processes occurring in that particular instance and enables the researcher to investigate complex educational phenomena in their naturally situations and not situations that were artificially created for the purpose of an experiment (Denscombe, 1998)

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The collection of data will combine focus group interviews and observation. Focus group interviews generate data regarding peoples' perception of a phenomenon under study and in this case it will generate data regarding educators' perceptions of the role of computers in teaching and learning.

1.6.2 LITERATURE REVIEW

The increasing use of information technology around the globe has raised important questions in education and this study, therefore will be reviewing the role of computers in teaching and learning in order to expand the content under discussion and demarcate the problem further. As such, the literature review will be used to form the theoretical framework of the study.

1.7 RESEARCH PROGRAMME

This research study comprises five chapters, and are briefly explained as follows:

Chapter one gives a brief background to the problem to be studied as well as the aim of study.

Chapter two contains the literature review in which relevant literature is reviewed in order to demarcate the problem further and it also expands the content under discussion, giving the background and the theoretical framework of the research study.

Chapter three deals with the research design for this study, the description of the method of investigation and motivation of the research methodology.

Chapter four deals with the data analysis, the discussion of the analysis based

on gathered data, and reports the research findings.

Chapter five contains recommendations and conclusions of the study are made based on the findings of the data.

1.8 SUMMARY

Chapter one presented the background information about the widespread of computer technology in today's world as well as in education and formulated the research problem wherein the research questions were asked.
The aim of study which determines the focus of research were discussed as well as the context of the study, the clarification of concepts and the research design of the study.

In chapter two, expansion of the content of the topic under discussion in the literature review will be looked at.

CHAPTER TWO: LITERATURE REVIEW

2.1 INTRODUCTION

In chapter one, the background information of the research study was presented. This chapter will present the literature review about the role of computers in education. The increasing use of computers around the globe and in education has raised important questions about the relationship between educators and computers in educational settings.
Based on the classification of Forcier (1996), the use of computers in education are presented as follows:

- The impact of computers on educational management,
- Computers in teaching and learning, and
- Computers as research tools.

2.2 THE IMPACT OF COMPUTERS ON EDUCATIONAL MANAGEMENT

Computers has the most profound effect to management and administration of schools in an amazing manner because they give them opportunities of working more efficiently and effectively on their day-to-day tasks/activities than never before.
This point of view is supported by Van der Westhuizen (2000) who indicated that computers as management tools plays an important role of enhancing schools to generate complex timetables, keep records of staff members, their qualifications, subjects that they teach, their leave status and personal details.

This is further evidenced by Forcier (1999) who indicated that computers as productivity tools enhances management in schools in the following areas:

2.2.1 Budget

Computers as productivity tools gives school administrators and educators the opportunity to prepare a budget depending on records of historical information stored/saved in the computer to form the foundation of future budget developments.
This is made possible by computer-based file managers and spreadsheets which enables school's administrators and educators to accomplish tasks of budget preparation and management to an extent of projecting ahead in areas of school and program enrolment, staffing needs, curriculum changes and inflation (Picciano,1994, Lockard, Abrams, Many, 1994).

Furthermore, computer-based file managers and spreadsheets provide the user with current accurate records in a timely fashion and the ability to reflect changes dynamically as the user manipulates variables to look at projections.

2.2.2. Inventory

In this application, the school personnel with the use computer-based file manager can record use of food and janitorial supplies to textbooks, curriculum materials, and instructional equipment, track inventory levels, the location of items and their condition easily and accurately as well as making information available at a moment's notice (Picciano,1994, Lockard, et al,1994).

2.2.3 Learners Records

Schools are expected to keep different records concerning learners. However, with the use of computers these records can be processed easily, quickly and more efficiently with a well designed computer-based system and can yield more potentially useful information by creating a more complete profile of the learner's following information:

- Health and immunization records beginning in primary grades,
- Information about home and parents,
- Attendance is closely followed,
- Grades are calculated and stored, then grades reports are generated,
- Individual education plans are tracked and learners' growth in ability and performance levels monitored,
- Participation in athletics, music, talented and gifted programs and extracurricular activities is noted (Picciano,1994, Lockard,1994, Van der Westhuizen,2000).

2.2.4 Communication

Computers play a very important role in communication with the use of word processor application whereby a great deal of clerical time is saved and the amount of correspondence between school and home when sending letters to parents increases (SAIDE,1998).

Furthermore, when schools are networked throughout a district, modems allow them to communicate by exchanging memos, notices of important events, and attendance data. Educators can access lesson plans stored on electronic bulletin whilst learners can reach across the miles to others and to begin to understand that they are part of the "global village" (Forcier,1996)

2.2.5. Computers in the library

In schools where computers are used in the library, the tasks are performed quicker and more accurately than manual system and they provide the user with information no easily acquired in the past.

The whole process in the library is enhanced by an automated circulation system employing a computer and bar codes on the circulating materials, generating lists of library holdings and overdue materials as well as recording

borrowers' transactions quickly and efficiently. It also provides inventory control to a level that was never possible before and calculates statistics.

2.2.6. Library Public Access Catalog

When an on-line public access catalog system is used at the media centre, the user can easily browse the collection electronically and perform author, title, subject, and keyword searches. The system is good in supporting direct queries, and can generate highly specialised bibliographies. However, computers serving as PAC terminals can also give the user access to external databases (Forcier,1996)

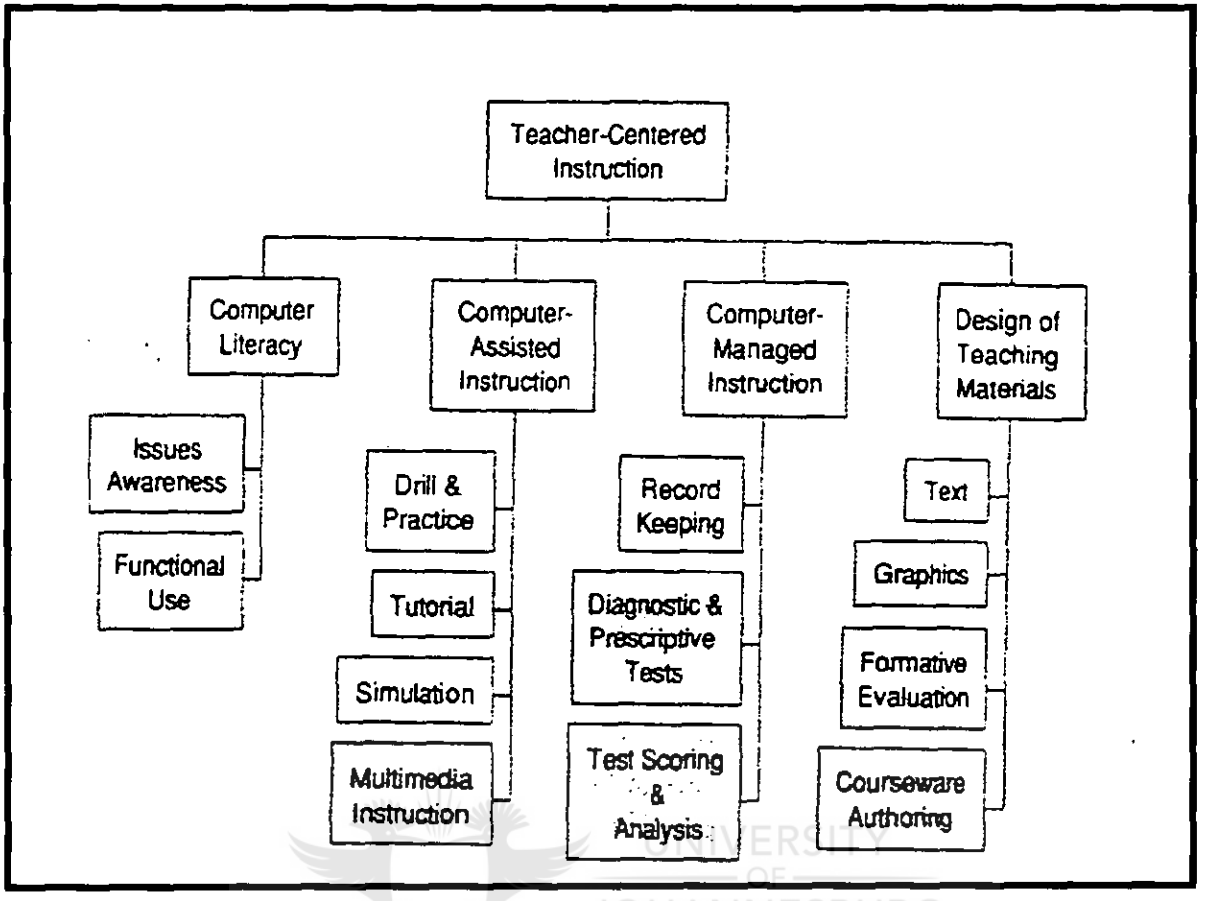
2.3 COMPUTERS IN TEACHING AND LEARNING

Computers play a dynamic role in teaching and learning, as they have become powerful tools for knowledge generation, delivery, interchange and use (Dillemens, Lowyck, Van der Perre, Claeys, & Elen,1998).

This point of view is supported by Muffoletto and Knupfer (1993) who asserts that computers challenges the traditional instructional focus by transferring it from individual educators to a multitude of instructional sources such as text, sound, colour, graphics, animation and multimedia.

However, Forcier (1999) identified the most common elements of computers in teaching and learning which are educator–centred instruction and learner–centred learning, these two elements have sub-categories that are classified within them. The sub-categories of educator-centred instruction are indicated in table 2.1 below.

Table 2.1 Sub-categories of educator-centred instruction



This table was adapted from Forcier (1996:5)

2.3.1 Educator/teacher – centred instruction

Educator-centred instruction implies the interaction of the learner as an individual or in groups setting with the computer under the educator's control, supervision and guidance. The educator also takes into account the planning, preparation, and delivery of instruction (Forcier,1999).

This approach is more related to behaviourist theory wherein teaching has traditionally been seen as the sole responsibility of the educators and everything was centred around them as sources of knowledge who has to transmit information to the learners following carefully planned steps of stimulus – response pairing and reinforcement to reach a goal (Forcier, 1999)

Furthermore, educator-centred instruction includes areas of computer-assisted instruction, computer-managed instruction, computer literacy and design of instructional material.
These areas will be discussed briefly as follows:

2.3.1.1 Computer-Assisted Instruction (CAI)

According to Hannafin and Peck (1988), CAI is an abbreviation for "Computer Assisted Instruction." The computer assists the learner by delivering an instructional programme. Forcier (1996) on the other hand indicated that computer-assisted instruction is a term that is applied to teaching and learning situation that involves the direct instructional interaction between the computer and the learner.

The computer as a tutor can play a very important role of presenting learning experiences using computer assisted lessons through approaches such as **tutorials, drill and practice, simulations and instructional games** in an interesting and effective manner. Each of these approaches provides a unique way of using the computer to teach, reinforce, practice, or apply, for example:

(a) Tutorials

According to Newby, Stepich, Lehman, and Russell (1996) tutorial application is a program that exposes the learner to the material that has not been previously taught and can used for learning all types of content. Newby, et al (1996) also indicated that tutorials provides for the highest degree of learner participation because it introduces new concepts in a sequenced, interactive way.

In tutorials information is taught, verified, and reinforced through interaction with the computer. In this regard, tutorials may be seen as replacing the bulk

of the teaching function of textbooks, filmstrips, lectures, or other systems in which new information is presented. Tutorials can teach well-defined objectives thoroughly enough to eliminate the need for repetition through another teaching system (Hannafin & Peck, 1988)

Furthermore, tutorial programs helps learners who have been absent from class as they may be assigned with independent study if they exhibit difficulty with specific skills and concepts. Tutorials can be used to supplement more traditional methods and they can be used to challenge advanced learners who wish to explore areas not included in the regular curriculum. (Bitter, 1989, Picciano,1994, Roblyer, Edwards, Havriluk, 1997).

b) Drill and Practice

Drill and practice is a time-honored technique used by educators to reinforce instruction by providing the repetition necessary to move acquired skills and concepts into the long-term memory. Computers are really essential in that they are able to provide learning experiences, which are not possible without them (Forcier,1996).

This point of view is supported by Hannafin and Peck (1988) when they indicate that drills of any sort, with workbook, flashcards, are not very interesting and interactive as compared to computerized drills which can be made more interesting through competition, the use of graphics, informing students of progress and introducing variety.

Furthermore, the use of interactive graphics can be used to increase effectiveness of the drills in ways not possible with workbooks or flashcards. The use of graphics as a prompt, as a context, as a motivator, and as feedback can all serve to make computerized drills more effective than any other types. The computer is also good for storing different types of data automatically and effortlessly and this permits better methods of item queuing,

retirement, and drill termination. It also permits permanent records for the educator about learners' performance. (Hannafin & Peck,1988, Newby, et al,1996).

In addition, drills and practice are applicable in all types of learning such as spelling or foreign language word translation, to verbal information, such as definitions, historical facts, or scientific concepts and principles, to simple problem solving such as problems in the physical and social sciences (Hannafin & Peck,1988).

(c) Simulations

According to Bitter (1989) simulations presents learners with realistic situations in which they make decisions and practice skills. The computer presents a set of conditions to which learners must respond in real world situations.

This is point supported by Newby, Stepich, Lehman, and Russell (1996) who indicate that simulations promotes decision making and build positive attitudes by putting learners in roles with which they are not familiar, for an example, learners can pretend that they are operating a household budget from which they pay for food, transportation, recreation, and others. Periodically they draw a "life event" card, which give them extra income or leads to financial setback. These simulated experiences give them insight into how they might respond to similar situations and provide them with an opportunity to explore their own values and actions.

Alessi and Trollip (1991) on the hand indicate that simulation is an instructional methodology that uses the full power of the computer for instruction, because it can teach some dangerous aspect of the world by imitating or replicating it, enabling learners to build a useful mental model of

the part of the world and to provide an opportunity to test it safely and efficiently.

Furthermore, simulation provide an environment that facilitates learning or the acquisition of skills, and it also enhance safety in learning, provide experiences not readily available in reality, modify the time frame, control the complexity of the learning situation for instructional benefit, and save money (Alessi & Trollip, 1991).

d) Instructional games

According to Hannafin and Peck (1988) games are a powerful instructional tool that are becoming prevalent with the proliferation of computers in schools because they provide learners with entertaining challenges and learning environment in which the educator plays a less dominant role and is not the only judge of performance, thus encouraging many learners to interact freely with the educator.
Instructional games also tend to motivate learners as they focus their attention on the goal of the game and this leads to more efficient learning, for learners are not easily distracted by classmates, daydreams or external events (Alessi & Trollip,1991).

Furthermore, Newby et al (1996) indicated that instructional games can be incorporated into many instructional situations in order to increase learners' motivation and levels of effort for specific learning tasks, provides the opportunity for practice of skills with immediate feedback, and helps learners to deal with unpredictable circumstances.

2.3.1.2 Computer Managed Instruction

According to Forcier (1996) Computer Managed Instruction refers to the use of computers to manage learner progression. Computer Managed Instruction emphasises the management of learner's performance in a direct on- line approach with the learner working directly at the computer whereby a learner takes a test which is analysed by the computer to determine performance on test items related to established goals and supplementary off- line activities may also be suggested, or in an off line approach whereby a learner respond to test on optical scored cards, optical scanner records learner's responses, the computer analyses learner's performance on test items related to established goals and the computer further directs learning activities based on performance analysis and the educator can retrieve learner's profile from the computer.

Computer managed instruction helps the educator to gather information about learners' performance in order to make instructional decisions about a learners' programme. In addition, this category relies more on spreadsheet and database management for record keeping and analysis role of learner's test scores. According to Simonson and Thompson (1997), the spreadsheet gives the educator power to create environments where the learner is an active participant in numerical problem situations.

Educators use spreadsheet for grade records because of ease and efficiency of calculations, of which once template is set up, totals and percentages are automatically updated a new score is added. Furthermore, spreadsheets gives educators the opportunity of drawing class lists, sorting them alphabetically or by achievement and managing attendance register easily.

Marks can be recorded and averages worked out and sorted thus enabling highest and lowest achievements' identification easily (Simonson and Thompson, 1997). Spreadsheets can also be used to keep financial records

for class projects or fundraising and they are ideal means for providing young athletes with immediate statistics on their performance.

Van der Westhuizen (2000) on the other hand gave some examples of how spreadsheet can be used to teach specific topics:

- In Geography, learners can be asked to measure daily temperature, precipitation or humidity, data can be collected over a period of time and can be entered into a spreadsheet and learners can then generate a graph that can be analysed in order to determine trends in rainfall over an extended period of time.
- In accounting learners can be taught how to draw up an income and expenditure sheet by means of a spreadsheet.
- In mathematics learners can be taught how to generate graphs using numerical data or formulae.
- In business economics and accounting learners can be taught about sales, profit and expenditure, they can form imaginary companies and keep the books on a spreadsheet. Graphs relating to sales can be generated.

A database is a collection of data or information of a particular kind such as names and addresses, titles of books arranged in a way that makes it easy for the user to find and use that information (Barker, Beyers, Cole, Goosen, Knipe, Schreuder, Snyman, Turley, Kula, Mosimege, Ndlela & Van der Westhuizen, 2001). Furthermore, database gives school administrators the opportunity of keeping records on learners and parents' information such as names, addresses, marks and sub-fields. It enables them to keep records on equipments used at school, Library material and information, Participants in extra-mural activities, staff records and any information that is traditionally stored in files.

In addition, it also enables the educator to manage individualized instruction in an overcrowded classroom and the learner's progress can be tracked

effectively and efficiently. Computer managed instruction offers the advantage of simultaneous compilation, correction, record keeping and analysis of tests and examination- papers.

2.3.1.4 Computer literacy

There are several definitions and descriptions of the term computer literacy. According to Forcier (1996) computer literacy is the study of the development and functional use of the computer as well as related societal issues. However, in this research study the researcher supports the one by Luehrmann (1982) which indicated that "computer literacy means the ability to do something constructive with the computer, not just possess a general awareness gleaned from what one is told about computers"

This implies that it is not enough for educators to become aware of how computers are used in society, the misuse of the computer and the computer ethics. Instead they should acquire knowledge of what a computer can do or cannot do as well as the survival skills of handling disks, booting up the programme and application skills such as word processing, database management and spreadsheet (Van der Westhuizen, 2000)

2.3.1.5 Design of Teaching Materials

With the advancement of computer technology in teaching and learning, educators are learning that the computer can significantly increase their ability to create their own materials and not rely on commercial produced materials. This is made possible by the following applications:

- Word processor

According to Capron (1995:236) a word processor is a software programme that allows one to create, edit, format, store, retrieve and print a text

document. Van der Westhuizen (2000) on the other hand views a word processor as a software whose primary responsibility is to facilitate written communication and systematic organization of procedures and equipment to display information efficiently in a written form and to preserve it electronically.

Morrison, Lowther and Demeulle (1999) provided several reasons of using word processors in the educational setting by both educators and learners and they are as follows:

- ❖ Ease of use

Word processing enables educators to create one word processing activity that combine several curriculum areas and learning objectives whilst learners can use it for all their writing activities, everything from creating lists to newsletters, class notes, examination papers, learners' assignments and a wide range of other prints resources can all be created and stored using word processors (SAIDE, 1998, Morrison et al 1999

- ❖ Refinement of work

Word processors can be used by the educator as a tool to evaluate learners whereby tests and exams are set, saved, used again at the next occasion, change portions of the existing test by cutting and pasting it to create new tests (Van der Westhuizen, 2000).

Capron (1995) on the other hand emphasizes that word processor gives the user the opportunity of making corrections easier without redoing the whole thing because if the document needs to be changed, it can be retrieved, edited and saved again or printed without retyping and this saves time.

The educator can refine his/her work by reorganizing the material and refine what has been said by assessing the relevance of the content and deleting

any unimportant information. Learners can work on rough drafts, edit unclear things and check for spelling and grammatical errors.

(b) Graphics

Graphic programs gives the educator who are non-artistic the opportunity to create respectable illustrations with self-confidence, graphics enables educators to make the appearance of worksheets, notes and tests more interesting. Educators can use desktop publishing software to make posters and banners, and they can also use scanners to insert graphic images into notes, print maps, cartoons or diagrams, Whilst Paint software can be used by mathematics educators to make diagrams, and Presentation software can be used to create slide shows that present learning content.

Programs such as CorelDraw, enables educators to create bulletin board and display graphics and text, Powerpoint allow the educator to create and project a series of images containing both text and graphics, Crossword Magic permits the creation of crossword puzzles, to drill learners in vocabulary, terminology and definitions of any subject area. The use of this computer programs supports the educators to maximize their creative efforts.

2.3.2 Learner-Centred Learning

According to Forcier (1999) learner-centred learning is an approach that views the computer as an information tool for learners' use to create, access, retrieve, manipulate and transmit information. This enables the learner to become the user, creator, disseminator and builder of his/her knowledge and to be the bearers of the responsibility of planning and decision making of their learning. The educator is seen as working along with learners by presenting himself/herself as a learner rather than as a source of knowledge and information (Means, 1994)

A similar point of view is reported by the panel of Educational Technology of the President's Committee of Advisors on Science and Technology (1997) that " the real promise of technology in education lies in its potential to facilitate fundamental, qualitative changes in the nature of teaching and learning". They further indicated that a move towards a student centred constructivist paradigm offers "the most fertile ground for the application of technology to education" (PCAST,1997)

This is further evidenced by Forcier (1999) who presented the constructivists' perspective wherein education is viewed as inseparable from ordinary life because learners assume control of their educational activities by making choices related to individual interests through developmental exploration and play. It is believed that this learning environment enables learners to discover rules and concepts, and use problem solving strategies which in turn are developed while learning how to think. The following applications as identified by Forcier (1999) give evidence:

2.3.2.1 Learner as the constructor of knowledge

The computer as the productivity tool enhances learners to view a computer as a productivity tool similar to a pencil, brush, or calculator for problem solving and for constructing own knowledge. This is made possible by using the following applications:

(a) Word processing

The word processor allows learners to express ideas with the educator's guidance and refine the quality of their expression with ease.
Word processors and desktop publishing enables learners to publish classroom and school newspapers.

- Creativity and personalization of work

Word processor gives learners the opportunity of disclosing their creativity by using different types of fonts available to them, changing appearance of some words by making them bold or italic or underlining them and by adding colour if they have a colour printer or if the educator will assess the work from the computer.

Learners can personalize their work by including borders or drawings which they have created or imported from clipart collections or from the internet. They can add customized graphs and charts or use layout that resembles a newspaper or magazine article. As thus, learners of all ages can become authors and their books can be placed in the school library for others to read (Morrison et al, 1999).

- Equity in final products

Word processing enables the educator to easily read learners' work without guessing about what a learner is trying to write and actual learning can be assessed more equitable thus making the grading process easy and unbiased. However, learners are given an equal opportunity to create professional looking documents thus decreasing learner's embarrassment over poor handwriting or biased educator's grading based on poor performance.

All learners are given the opportunity to concentrate more on what they say rather than what word processing looks like and this enables them to create a document that is legible and attractive (Morrison et al, 1999).

- Workforce tool

The educator who uses word processor more often with learners tend to prepare them to become productive citizens in the workforce because it is a common skill needed by many employees in numerous occupation.
Word processing prepares learners in their future careers such as writing newspapers, magazines, articles, creating letters to people with overdue bills, entering names and addresses into a computer at an auto-repair shop and many other things (Morrison et al, 1999)

b) Graphics

Paint and draw programs allows learners artistic expression and nonverbal communication as they prepare signs relating to co-curricular activity, maps for social studies project, posters promoting a candidate in a school election, banners proclaiming significant events. Graphics allow learners to explore spatial relationships of an idea and also to examine abstract numeric relationships in a more concrete manner.

2.3.2.2 Information Retrieval and Processing

Database managing and spreadsheet tools allows a learners to use telecomputing on the internet, research on the World Wide Web, database searching, and spreadsheet focasting to investigate information in depth. This powerful search strategies enables the learner to find answers to perplexing questions, connect related facts, and derive new information.

This is made possible by sorting information to examine precedence and develop a better understanding of linear relationships or hierarchical order, also by altering variables in a problem to explore cause- and effect relationships and forecast results of a decision. As thus, the computer is an

indispensable tool that simplifies learners abilities to build knowledge (Forcier, 1999).

2.3.2.3 Learner as a Problem Solver

This approach allows the learner to use a computer as problem-solving tool as it them to explore solution strategies and it can organize and manipulate information, thus allowing the user to test tentative solutions before adopting the most appropriate one.

2.3.2. 4 Learner as user of Multimedia Learning and Authoring

According to Shelly, Cashman, Waggoner and Waggoner (1997) Multimedia authoring software enables the user to create a presentation using text, graphics, video, sound and animation.
As thus, multimedia learning gives the learner control of powerful tools in the exploration and creation of information. In addition, it allows learners to compose a computer statement that might include computer generated sound, graphics, along with sound and visual forms stored in another medium such as videodisc, videotape, or CD-ROM, or downloaded from a source on the internet.

Furthermore, multimedia allows learners to explore and create information. The learner is also given the opportunity to compose a complex statement that might include computer generated sound, display text, graphics, audio, video animation and present the products as evidence of knowledge they have constructed (Forcier, 1996).

2.4 COMPUTERS AS RESEARCH TOOLS

2.4.1 Computers in educational research

According to Forcier (1999) the computer as a research tool supports action research by placing the educator in the role of the researcher, allowing him/her to examine some aspect of classroom practice. Computers also give learners tools for research (Houghton,1997).

2.4.2 Computers in statistical analysis

The advent of powerful statistics programs available on personal computers enables educators to examine learners' performance data in new and revealing ways because they are moving toward new product oriented, criterion based methods of assessment in outcomes based education, and they are also attempting to understand and compare learners' performance through means such as quartile analysis, in which four groups of learners based on their performance are measured.

2.4.3 Computers in Bibliographic searches

The Computer enables educators to acquire bibliographic citations of studies performed by other educators around he world from the desktop. This is made possible by a teaching resources database called A-V Online, published by Silver Platter, which gives a brief descriptive annotation, subject matter classification, and grade level and identifies sources of films, filmstrips, video-tapes, and others.

2.4.4 Computers in data retrieval

Computers play a very important role in information retrieval in teaching and learning because it can be done easily and cost effectively.
Educators and researchers probing a specific topic may perform a survey of existing related literature from remote and local databases, generate bibliographies of locally available material by searching their library's public access catalog, and analyze the collected data.

2.5 PRESENTATION OF THE USE OF COMPUTERS IN EDUCATION IN A MATRIX

The use of computers in education as discussed in paragraph 2.2-2.4 is now presented below in table 2.2 in the form of a matrix. This matrix will be used to assess the implementation of computers at Tshedza Comprehensive Primary School (compare paragraph 4.5).

Table 2.2 Presentation of the use of computers in education in a matrix

Computers in Educational Management	❖ Budgets ❖ Inventory ❖ Learners' records ❖ Educators' records ❖ Communication ❖ Computers in the library
Computers in Teaching and Learning	Teacher – centred Instruction ❖ Computer-assisted instruction a) Tutorials b) Drill and Practice c) Simulations d) Instructional games ❖ Computer-managed instruction

	❖ Computer literacy ❖ Design of instructional material a) Word processor b) Graphics Student- centred Instruction ❖ Learner as the constructor of knowledge a) Word processing b) Graphics ❖ Information Retrieval and Processing ❖ Learner as a Problem solver ❖ Learner as user of Multimedia learning and Authoring software
Computers in Educational Research	❖ Statistical analysis ❖ Bibliographical searches ❖ Data retrieval

In table 2.2 all elements pertaining to the use of computers in education are arranged according to their presentation in the research study.

2.6 SUMMARY

This chapter reviewed the literature about the role and the use of computers in education. However, the following issues which are: the impact of computers on educational management, the impact of computers on educators' tasks, and computers as research tools were looked at.

The impact of computers on educational management was divided by data processing and information retrieval functional categories: budget, inventory, learners' records, communication, library circulation, and library public access catalog.

Computers in teaching and learning was divided into two major areas, teacher /educator-centered instruction and student/learner-centered learning. Educator- centered instruction examined the computer as the instrument of instruction as well as a tool of instruction and management of instruction. It was subdivided into the categories of computer literacy, computer assisted instruction, computer managed instruction, and design of teaching material.

Learner-centered learning views the computer as a tool for the learner to use to create, access, retrieve, manipulate, and transmit information in order to solve a problem and it was subdivided into the categories of learner as the constructer of knowledge, information retrieval and processing, learner as a problem solver, and learner as the user of multimedia learning and authoring.

The computer as a research tool was divided into the categories of educational research, statistical analysis, bibliographic searches and data retrieval.

CHAPTER 3 : RESEARCH DESIGN/ METHODOLOGY

3.1 INTRODUCTION

In chapter two, literature was reviewed in order to illuminate the content of the topic under discussion, the role of computers in an educational setting. This chapter will present the research design that was followed in order to collect, record, and interpret data, as well as methods and techniques of analysing data, related to the case under investigation.

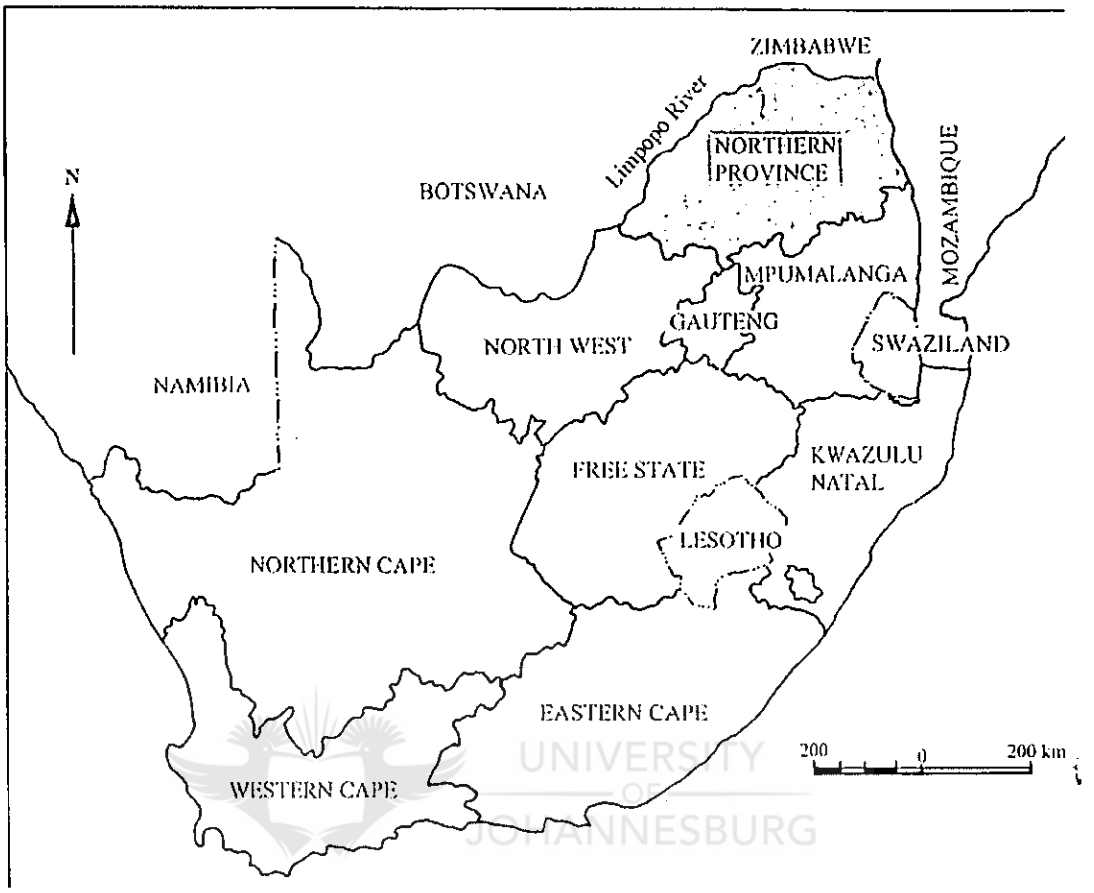
The research design is the plan and structure of the investigation used by the researcher to obtain evidence to answer research questions. The design describes the procedures for conducting the study, including when, from whom, and under what conditions the data will be obtained. In other words, design indicates how the research is set up, what happens to the subjects and what methods of data collection are used (McMillan & Schumacher,1993).

3.2 THE CONTEXT OF THE RESEARCH

This particular research study was conducted at Tshedza Comprehensive School, which is located in Region Three of the Northern Province in South Africa.

The Northern Province is the fourth densely populated province with 4,9 million population after Eastern Cape with 6,3 million followed by Gauteng with 7,3 million population and Kwa-zulu Natal with the biggest population of 8,4 million. It is the most disadvantaged province, with the majority of people living in village clusters and informal rural settlements with inadequate infrastructures (Department of Education, 1996).

Figure 3.1 The location of the Northern Province in South Africa



In figure 3.1 the province that is highlighted on the map is the Northern Province which is the province where the research study was conducted.

Furthermore, the province has the lowest literacy levels in South Africa, let alone computer literacy and as thus, it is still lagging behind as far as information technology is concerned. This is due to the imbalances/inequalities of the past such as: the provision of unequal access to schools, educational opportunities, irrelevant curricula, inadequate finance, inadequate facilities, shortage of educational materials and the enrolment explosion (Van der Horst & Mcdonald, 1997).

In addition, the educational systems and curricula are still not reflecting to the revolution of information technology, hence the use the use of computers in

schools appears to be limited. This is due to distribution and allocation distortions of funds eskewed in favour of whites in the past, as well as the gap between the provision of education in urban and rural areas, to the disadvantage of the latter, leaving them with inadequate facilities. (Dekker & Van Schalkwyk, 1996)

Tshedza Comprehensive School is one of the schools in the Thohoyandou district area, and is 3km from Thohoyandou township. The school opened in 1998, it is a public school that is comprised of middle socio-economic class learners and serves the communities around it. It has classes from grade R to grade seven with 483 learners and 13 teachers.

It is a modern school with three laboratories, a science lab, language lab and computer centre. The computer laboratory has 15 Pentium II microcomputers with CD – Roms, which are not networked. All learners are allowed access to the computer centre, where computer literacy is offered as a subject, by the computer educator following the scheduled time of the timetable for each grade.

The reasons for selecting Tshedza Comprehensive School as the focus of the research study are as follows:

- The school has a computer laboratory with 15 computers, which provide a basis for the growth of computer use in teaching and learning in the school.

- Computers have been at the school for at least three years and it was felt that this was a reasonable period during which computers could be established as part educators' instructional tools.

- ❖ This particular school has been selected because of lack of sufficient information regarding educators' use of computers in teaching and learning in the school.

- ❖ Educators are presently not using computers in their day-to-day activities. The realization that this technological development is not used to a large extent by educators will also be emphasized.

The participants of this case study were drawn from Tshedza Comprehensive School in Region Three of the Northern Province, namely, educators. Data on educators' perception about the role of computers in teaching and learning was collected. The population included educators who were non-users of computers as well as those who were experienced users.

The participants of the study included seven educators. Of the seven educators, five were females and two were males with an average of nine years of teaching experience. Survey data indicated that three of the seven educators had computer literacy certificates including the computer educator whilst the other four have had little or no exposure to computers.

3.3 THE RESEARCH APPROACH

The research approach that was used in this research study is qualitative in nature because data was collected in the form of words about human experiences rather than numbers, words have a concrete, vivid, meaningful flavour that often proves far more convincing to a reader or another researcher (Miles & Hurberman, 1994).

Furthermore, the research study will be based on a qualitative approach because the focus of this study is on human experiences and data will be in the form of words and not numbers. This approach is flexible and evolves as

the process unfolds without losing the originality of the topic. This was always kept in mind and had the research questions as a guide. The data collection steps involves setting the boundaries for the study, collecting information through observations, interviews and establishing the protocol for recording information (Creswell, 1994).

In this particular study, a qualitative approach was used because the research focus consists of writings on perceptions and experiences of educators at Tshedza Comprehensive School about the role of computers in teaching and learning. Furthermore, qualitative data are the source of well-grounded rich descriptions and explanations of the processes in identifiable local contexts. Miles and Huberman (1994) refers to "local groundedness", wherein data is collected in close proximity of the specific situation, embedded in its context. This means that qualitative researcher study things in their natural settings, attempting to make sense of or interpret phenomenon in terms of meaning people bring to them (Creswell, 1994; McMillan, 1992, Denscombe, 1998 and Strauss & Corbin, 1992). In this regard, the educators at Tshedza Comprehensive School were studied at their natural setting in order to make sense of the perceptions and experiences that educators have about computers in teaching and learning.

In addition, a qualitative approach enables the researcher to gain a holistic view of the particular context of study, as it aims to form an integrated and comprehensive understanding of a particular situation and the participants in it (Miles & Hurberman,1994).

Qualitative research has three major components. The first component is the **data**, which can be collected by a variety of methods or techniques and in this research study, data was collected by means of focus group interviews, open-ended questions as well as participant observation. Secondly, qualitative research consists of the different analytic or interpretative procedures to arrive at the research findings.

The third component of qualitative research is reporting. Reports on findings are either presented in a written form or verbally and in this research study a report will be presented in a written form (Strauss & Corbin, 1990).

Qualitative approach was chosen in this particular study because of its flexibility of giving the researcher that latitude of making choices of methods to be used in data collection, choice of analytic procedures and ways of reporting the findings are not prescribed.

Qualitative data is collected in a number of ways and it can come in a number of formats: field notes, interview transcripts, texts, etc (Lofland & Lofland, 1995, Denscombe, 1998) In this research study, data was collected through focus group interview and observation and data received was in the form of interview transcript and field notes, and was prepared in a format that lend itself for analysis.

3.4 THE CASE STUDY METHOD

There are various methods that exist within the context of qualitative approach and in this research study case study method will be used. Case studies comprise a very important and useful means of gathering information in qualitative approach. It studies a specific aspect of a problem in some depth within a limited time scale and is particularly appropriate for individual researcher. It is important to note that case study investigations focus on naturally occurring situations, and not situations that were artificially created for the purposes of an experiment (Denscombe, 1998).

The research focus of this particular study which is Tshedza Comprehensive School, it was not artificially created but identified because of its uniqueness in the whole district of Thohoyandou, that is, being the only Comprehensive

School in the district and having the observable features during new implementations like innovations of computers.

The presence of computers at Tshedza School enabled the researcher to collect data on educators' perceptions and experiences about the role of computers in teaching and learning.

The case study method was used in this particular study to focus on the perceptions of educators about the role of computers in teaching and learning at Tshedza Comprehensive School, which is a single case, and not on the whole population of cases. Denscombe (1998) describes this very specific focus as a "spotlight on one instance".

Bell (1993) describes case study as an umbrella term for a family of research methods that focuses around an inquiry around an instance. The implication of this is that the case study researcher is not necessarily looking for findings that are generalisable to wider populations (Macmillan & Schumacher, 1993, Stake, 1988). As thus, it will not be claimed that the findings of this study are generalisable to wider populations although it is believed that valuable insight will be gained that may be used by similar institutions.

In addition, case studies in this particular study was used because it offers more than mere descriptions of events or states, and it allows a systematic collection of evidence during which data relating to the perceptions and experiences of educators about the role of computers in teaching and learning was studied (Stake, 1988, Denscombe, 1998).

3.5 DATA COLLECTION TECHNIQUES

At some point in the study, the researcher must make a decision about the tools of data collection. In this research study, the main data collection tools

that were used were focus group interviewing, open-ended questions and participant observation.

Focus group interview involves a small group of people who are interviewed in order to provide diversity of perceptions (McMillan,1992). In this research study, seven educators of whom some were non-users of computers and others more experienced were interviewed and they provided varied perceptions about the role of computers in teaching and learning at Tshedza Comprehensive School.

The aim of this interview was to promote discussion and interaction among educators that could lead to a richer understanding of the phenomenon under discussion (De Vos,1998). Lofland and Lofland (1995) indicate that focus group interviews allows participants time for reflection and to recall experiences.

The researcher used a tape recorder, with the permission of interviewees and an assurance of confidentiality was made in order to ensure that everything said during the interviews was preserved for later use in analysis. The purpose for the use of tape recorder was explained before the interviews started. Data from interviews was analysed after all responses have been transcribed. Transcriptions follow specific procedures and conventions in order to be analysed successfully.

Open-ended questions were used in the gathering of data during the interview session and the questions were focused in such a way that they were clear and topics of discussion were carefully predetermined and sequenced in an understandable and logical way. Emphasis was placed on finding as much as possible about educators' experiences and feelings about a specific aspect of social reality (De Vos,1998), and in this case the experiences and perceptions of educators at Tshedza School about the role of computers in teaching and learning was the focus of this research study.

By **participant observation** is meant 'being there' and 'being in the middle of things'. As a researcher, I observed things that were happening, listened to what was said and eventually interviewed educators and observed educators openly because my role as a researcher was openly recognized (Denscombe, 1998, Bell,1993).

As a researcher, my task as a participant observer was to make field notes, which are detailed, written descriptions of what was observed and I wrote the them immediately as I got home. The field notes became part of the data that was analysed. (Bell, 1993).

In addition, during the research process, I spent time at the site of study, which is Tshedza Comprehensive School with selected educators and observed the way educators expressed their perceptions and experiences about computers in teaching and learning and in the process their words, feelings, and beliefs were important because observation includes taking cognisance of verbal and nonverbal behaviour. As thus, field notes were recorded noting observations of participants' behaviours.

3.5 DATA COLLECTION PROCESS

Access to Tshedza Comprehensive School was gained by direct contact with the management of the school. I introduced myself as a student from the Rand Afrikaans University (RAU) doing research in the field of curriculum studies and briefed the principal about my research study verbally. The principal then assigned the computer educator whom I had to directly contact for further arrangements.

This first visit included the inspection of the computer laboratory to see the number of computers in use, statistical data as to how many learners were

attending in the school as well as the number of educators was collected during this visit. A further appointment with the assigned educator was made, on when further visit to the school could be made to collect data.

The data collection process started during the last quarter of the academic year in July immediately after reopening. This was not a busy period since teachers were coming from winter holidays. A focus group interview was conducted with educators. The interview was conducted in a room that served as a staff room for these teachers. The chairs were arranged in a circular form with a tape recorder placed in the centre of the group. As an interviewer, I formed part of the group, seated in the middle of the circle. The questions asked during the interviews were as follows:

- Please tell me about your experience with computers other than here at this school, either at your previous school/s or anywhere else
- Please tell me your about perception of computers at this school
- Please tell me how computers are used at this school
- Please tell me more about the role of computers at this school
- Please tell me how you would use computers at this school if given the opportunity
- Please tell me about your perceptions and experiences about the implementation of computers at the school.

Before I started the interviews I introduced myself to the group of educators and explained to them the purpose of my study, which is to determine their perceptions about the role of computers in teaching and learning. I assured them that that the information that they give will be kept confidential to an

extent that no names will be used when reporting the findings of the study. The atmosphere was also relaxed and non- threatening to educators as they were free to express themselves in their mother tongue.

The language used during the interview was Tshivenda. This allowed the interviewees to express themselves freely and clearly. The interviews produced typical direct quotations, which according to Patton (1987) were a basic raw data in qualitative evaluation. They revealed the respondents' level of perceptions, experiences, feelings, and beliefs about computers.

3.7 DATA ANALYSIS

The analysis and interpretation of qualitative data is quite different from that of quantitative data, and the aim of the analysis is to discover patterns, ideas, explanations and understandings (Mcmillan & Schumacher, 1993).

Qualitative research is concerned with meanings and the way that people understand things as well as with patterns of behaviour (Creswell, 1994). This study seeks to discover educators' understanding of computers, their perceptions and experiences about them in teaching and learning at their school.

Qualitative data undergo a number of processes in order to be analysed. The first step is the coding and categorising of data. According to Strauss and Corbin (1990), coding is the procedure by which data are broken down, conceptualised and put together in new ways.

However, some considerations in the analysis of qualitative data was taken in consideration using Miles and Huberman (1994) techniques which consists of linked subprocesses: data reduction, data display and conclusion drawing or verification.

Data reduction refers to the process of selecting, focussing, simplifying, abstracting and focussing the collected data. As thus, data in this particular research study was selected focusing more on educators' perceptions and experiences about the role of computers in teaching and learning at the school.

Data display is an organised, concise assembly of information that permits conclusion drawing. Data in this research study was reduced as the research progresses and I wrote summaries from interview transcript, clustered data and identified emerging themes and categories by specific words, ideas or events to avoid extended text.

Conclusion drawing and verification involves making interpretations and drawing meaning from the displayed data. As a researcher I used a range of tactics such as comparing contrast, noting patterns and themes, clustering, use of triangulation, use of matrix as well as checking results with educators at Tshedza Comprehensive School in order to draw conclusion and verify my research study (Miles &Huberman, 1994).

To increase validity, I returned to the field to make follow-up using intensive interviews and this process is called triangulation (Mouton, 1996) whereby different methods of data collection were used and in this case, focus group interview, participant observation which indicate consistency achieved across techniques (Denscombe,1998).

Furthermore, I made use of the findings to see if they fit the data using comparisons and checking findings against 'reality' in order to determine the trustworthiness of data analysis (Miles & Hurberman,1994).
The final step was reporting the findings of the research study wherein educators' perception and experiences about the role of computers in teaching and learning were interpreted. These findings are presented in chapter four.

3.8 CONCLUSION

This chapter explained the method, techniques that were used in the collection of data and approaches in the gathering of data as well as strategies of analysing generated data, which will considered in determining the perceived role of computers in teaching and learning by educators at Tshedza Comprehensive School.

CHAPTER FOUR : PRESENTATION AND ANALYSIS OF DATA

4.1 INTRODUCTION

As stated in chapter one, the aim of this study is primarily to investigate educators's perception role of computers in teaching and learning at Tshedza Comprehensive School. When responding to interviewing questions related to this study, data on computer related activities were also considered.

Data was saturated as evidenced in repeating themes after the analysis of transcribed focus group interviews. The focus group consisted of seven respondents. Miles and Huberman's method (Miles & Huberman,1994) of analysis was applied to the data (also compare paragraph 3.7).

According to Rubin and Rubin (1995) the categories were chosen after extensive reading of the interview transcripts and simultaneous view of categories of the study on the educators' perception of the role of computers in teaching and learning as well as the assessment of the implementation of computers at Tshedza Comprehensive School against the matrix appears in the following discussions.

4.2 CATEGORIES DERIVED FROM DATA ANALYSIS

The researcher listened and read the responses carefully and generated categories. In this study, categories were generated from the way questions were structured and responses made by the interviewees. Categories were derived from the data, namely educators' expectations due to the availability of computers at the school, the role of computers at the school, and educators' perception about the implementation of computers at the school. Further subcategories were identified within each of these categories. The various categories will now be discussed in detail with supporting quotes from

the data. Categories were grouped according to experiences, perceptions and knowledge.

4.3 EDUCATORS EXPECTATIONS ABOUT THE PRESENCE OF COMPUTERS AT THE SCHOOL

The first group of categories clusters on educators' expectations due to the presence of computers at the school and the impact of computers upon them. However, when asking educators about their expectations due to the presence of computers at the school, their expectations varied as follows:

4.3.1 Educators were excited by the presence of computers at the school

All respondents reported that they were very excited about the presence of computers at the school because they all reported not having computers at their homes and were also coming from different schools with no computers. Educators' responses clearly indicated that their expectations varied, even though all expected to get more exposure and learn more about the use of computers in teaching and learning.

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Respondents' expectations about the presence of computers at Tshedza School were experienced as challenging and exciting as illustrated by the following quotations:

" When I first arrived at this school, I was very happy and excited to be at a school with so many computers. I was coming from schools with no computers, as thus I told myself that I am going to enjoy working with my learners on computers".

In fact to some of the educators, the presence of computers at this school was an answer *" Hmm....to me it was a dream come true. I always enjoyed*

working with computers but had little opportunity of using them as I would like at the previous institution that I was working, so being at Tshedza, the responsibility of introducing all learners of all grades was given to me and it was the best challenge ever. It was fun and I also got the satisfaction of seeing excitement in my learners when using computers at the computer laboratory".

However, the feeling of excitement was also expressed by one of the inexperienced educators *" I was so happy to be at this nice school with laboratories and computers, hmm.....for I never used the computer in my life and now being at a school with computers was great".*

All the participants specifically outlined their expectations of the presence of computers. It was evident from their responses that they were very enthusiastic and excited about computers at the school.

4.3.2 Educators expected to benefit as a result of the presence of computers at the school

When educators were asked to evaluate the benefits of being at a school with computers in relation to their expectations, they sounded dissatisfied and the following statements summarizes these educators' perceptions of the computers in meeting their needs and expectations:

"I was expecting to benefit from computers considering their number at this school and the fact that I was coming from schools with no computers. I was looking forward to spend most of my free periods on computers learning how to make the most effective and efficient use of this technology for my preparations".

On the other hand, some of the educators expected to benefit more *"I was*

expecting to develop increased confidence and enthusiasm about the computer to an extent of using them with my learners in the classroom to enhance teaching and learning as I was not coming across computers for the first time".

Another experienced educator agreed and further suggested, " I was expecting to refresh my memory about computer applications such as spreadsheet, database, word processor, and certain software that I was previously exposed to".

Some of the educators expected to acquire basic computer literacy skills and learn how to use computers in the classroom. For an example one educator commented, *"I was expecting to learn the basic skills of computers as I was coming across this machine for the first time so that I can use them for myself and for the learners."*

Educators' response to the above question clearly indicated that the presence of computers at Tshedza Comprehensive School challenged educators considerable. This is evident when educators with no experience expected the presence of computers to benefit them through hands on experience with computers, introduction to basic computer skills and applications as well as how to use computers in the classroom, whilst educators who are computer literate expected to benefit by enhancing their current skills of using applications such as word processing, Microsoft Powerpoint, spreadsheet, database management, as well as to explore advanced applications which are used in the classroom to enhance teaching and learning, for an example, computer assisted instruction.

4.4 THE ROLE OF COMPUTERS AT THE SCHOOL

This category focused on the role of computers in the educational setting at Tshedza Comprehensive School and the involvement of management and educators in using them. This category therefore, sought to discover whether the role of computers at this school was contributing towards enhancing management tasks as well as other tasks in teaching and learning.

4.4.1 Computers were playing a very important role at the school

When asking the management about their perception of the role of computers at the school, this is how they responded:
The principal believed that computers at the school were used to their advantage and were playing different roles such as the following: *"Computers form part of our school curriculum and their most important role is to help all learners of all grades to become computer literate because computer literacy is treated as a subject at the school and we have the computer educator who equips them with the necessary skills and knowledge".*

The principal felt that computers helps them handle different tasks with ease *"Computers are very effective in handling information such as learners' records of registration and payments and in this way we are able to trace our records fast and easily".*

The principal further indicated that *"Hmm ..... computers enables us as a school to communicate with parents and school governing body easily because one typed letter is printed to many letters that can be distributed to all of them thus saving time".*

The school principal's responses clearly indicates that they perceive the role of computers positively for an example, *" These machines are playing a very important role during examination periods because we are able to prepare our*

question papers in time and prevent our examination from leaking, this is one of the problems that we used to experience in the past as we had to take our question papers to the local people at the shopping complex with computers who type for payments".

However, some of the educators reported much greater gains of the role of computers in handling their different tasks as indicated by the following responses: *" I am a member of school governing body and I am delegated to perform many tasks to an extent that I find myself using computers more often for preparing minutes of the school after every meeting, letters to parents, and to me computers are playing a very important role which saves time and energy because instead of writing many letters to parents only one letter is made to become many by printing".*

This is also supported by the computer educator *" Hmm.....the role of computers is very important to learners as they become computer literate and be up to date with the technological development of today. Learners are able to write their names and paragraphs with computers".*

4.4.2 The role of computers was ineffective in teaching and learning

When asking educators about their perceptions of the role of computers in teaching and learning at the school, this is how they responded:

The role of computers was reported ineffective in teaching and learning by most of the educators interviewed. For an example one of the experienced educators commented, *" Hmm.....computers are not tools to be used like pen, pencil and paper at this school. They are not allocated for classroom use with learners and let alone to take learners to the computer room because they are not meant for enhancing teaching and learning as medium of instruction"*

The role of computers at the school was also reported inadequate because few tasks were handled by computers and their use by educators was infrequent as indicated by the following responses: *" I do not see much of the role computers at the school." I wish we can do more with this machines like giving presenting learners' with assignments but that is not the case, I only see computers assisting in making examination papers ready for learners during examination period".*

This is further supported by another educator who indicated the infrequent role of computers at the school *" The role of computers are more effective during examination times, which means that they are productive four times a year, as we have examinations quarterly at this school and in this way teaching and learning is not influenced by them as medium of instruction which can be fun for learners to interact with".*

Almost all the roles observed by the researcher as well as those described by the educators involved the word processor and this clearly support their dissatisfaction about the role of computers at the school because other applications of computer use in education were dysfunctional.

When asking educators why they believe that computers were not used as instructional tools, almost all the educators felt that computers at the school were not used as multipurpose teaching tools and are not available for educators as medium of instruction rather they are isolated or relegated tools focused on allowing learners to become computer literate.

For an example, *" I would say the use of computers at this school is predominantly not effective, not at all. I think the reason is that the role of computers in this school is seen as a pure discipline, that is, computer literacy and not as instructional tools".*

Another educator commented *"Hmm.... I see computers are not used as a teaching tool that can be used by all educators in almost every subject but kind of computer literacy thing which involves only leamers and the computer educator because we are sidelined at the school".*

Experienced educators indicated that the role of computers could have been effective as instructional tools if their use at the school was determined according to their needs. For an example, one educator suggested, *" I think that computers could be used in a variety of subject content areas in a variety of teaching and learning strategies to increase the efficiency and productivity into the school environment, thus enabling us to use computers as an instructional medium and as a problem solving tool in mathematics".*

Another experienced educator agreed and further suggested, *" I see that computers can play very useful roles as instructional tools for instruction and introduce learners to other computer applications which can improve learners reading skills such as in English and in many other areas of learning ".*

Furthermore, another educator added on the same view and indicated that he views computers as medium of instruction to enhance teaching and learning. *"I think I can use informational encyclopedia in my subject to create an effective learning environment for my learners to understand complex issues such as volcanic eruption, seeing it happening on the computer screen can be fun and interesting"*

The dynamic nature of computers in teaching and learning was also commented by the music educator who indicated that *"computers assist leamers in some of their lessons to save time by grouping notes that find the incorrect notes easy and faster than doing it manually which is very time consuming".*

Responses to this category revealed that almost all educators believed that computers at the school were not used as instructional tools and some of them were aware of the dynamic nature of computers in teaching and learning.

4.5 EDUCATORS' PERCEPTIONS OF COMPUTER IMPLEMENTATION AT THE SCHOOL

The category focused on educators' perception about the way that computers were implemented at the school.

When asking educators of their perceptions and experiences about implementation of computers at the school, respondents' perceived the implementation of computers at the school as a means of **dividing, demotivating and discouraging** them as members of the staff because of the lack or little exposure that they are experiencing in as far as the use of this technological development was concerned and their responses varied as follows:

" (sounding demotivated) To me computers at this school do not exist, but may be they do to those who are allowed to use them. I am like any other educator who is working at a school with no electricity, or computers."

Another educator commented *" Hmm... computers in this school divides us as a staff because only the computer teacher is allowed access to the computer laboratory without questions and what is more discouraging is that we have the same computer qualifications, that is six months diploma of computer literacy."*

It was very clear from the educators responses that they were not happy about the set up of the school in as far as computers were concerned *" I am very discouraged with how things are done at this school to an extent that the*

presence of computers in this school does not make any difference to me, no one taught me how to use my sewing machine, therefore I am not afraid of using computers, but now we are not given chance and opportunity to have hands on experience with them."

Although educators sounded discouraged by the set up of the school, they appeared to base their dissatisfaction differently based on their perceptions of computer implementation at the school.

Furthermore, educators' disappointment of computer implementation appeared to affect them negatively. Although most of educators mentioned limited access to the computer laboratory as a problem, they had different reasons for wanting access. For example, three of the educators indicated that they wanted access to the computer room so that they could learn how to use computers and become computer literate to an extent of knowing how to use them as instructional tools in the classroom.

The other educators wanted access to the computer room so that they can handle most of their tasks with ease *" I would like to do my preparations, lesson plans, and set test on the computer so that I can save my work and be able to use it next time, even changing here and there when need be but not redoing the whole thing".*

The other educator stated that *" If I had access to computers I could keep my learners records of achievement on the computer more especially now that in Outcome Based Education every learner should have a portfolio and a profile, with the computer it could be time saving and efficient to keep those records".*

However, one of the educators responded differently *" If I had access computers I would use them in a lot different way, I think I would use the end of it, like the presentation end such as drawing maps, giving assignments and*

class notes, give learners the opportunity of producing things on their own, thus enhancing their creativity".
Thus, "limited access" held different meaning for these educators and affected their perceptions about computers at this school.

Limited programs was another problem that was highlighted. For example, one educator indicated that *" If there were programs I could use them to help my learners solve problems in mathematics and also assist them in English for drill and practice",*

The computer educator on the other hand indicated that the use computers with learners was not the way it was expected/wanted, as thus, struggled to find effective ways to use the programs that were available at the school, *"It is not fun to work on computers with grade R and 1 learners on Microsoft word only, I would prefer it if I had programs such as games that can be enjoyable to them".*

Lack of relevance was reported as another problem perceived by educators, Educators in this category expressed their concern about lack of relevance of this technology that is being relegated to single area of "computer literacy" to an extent of not using these computers to enhance teaching and learning. Respondents referred to the management's limited knowledge as contributing to creating a context of limited implementation of computers by educators at the school.

4.6 ASSESSING THE IMPLEMENTATION AGAINST THE MATRIX

Research has shown that the effectiveness of computers in education is determined by their impact on management, teaching and learning as well as in research (Forcier,1996).

However, when assessing the implementation of computers against the matrix, the research at Tshedza Comprehensive Primary School showed that the impact of computers on management, teaching and learning, as well as in research were not more effective on all the applications.
The following appear to be the position of computer implementation at Tshedza Comprehensive School:

4.6.1 Computers in Management

Research has shown that computers enable the management to work more efficiently and effectively on these applications: budgets, inventory, learners records, communication and in the library of the school, library public access catalog.
At Tshedza School, communication is the most used application – for correspondents with parents and school governing body, computers were also used for budgets and keeping learners records of registration.

4.6.2 Computers in teaching and learning

The use of computers in teaching and learning has been shown to be more effective in educator/teacher-centred instruction and learner/student-centred instruction. In educator/teacher-centred instruction, the following applications were considered important: Computer-assisted instruction, Computer managed instruction, Computer literacy, and Design of instructional material. However, at Tshedza school computer-assisted instruction was not used at all, Computer Managed Instruction was used only in one application of spreadsheet and only the grade 7 learners were taught about the by the computer educator, Computer Literacy on the other hand was not prevalent to all educators interviewed, and design of instructional material was the most used application wherein the word processor played the most important role in various activities such as preparing the examination papers and graphics was not used at all.

In learner/student-centred instruction, the following applications were considered important: Learner as constructor of knowledge, information retrieval and processing, learner as a problem solver, multimedia learning and authoring. At Tshedza School all learners of all grades build their knowledge through the use of word processing to create documents and the other applications mentioned above were not used at all.

4.6.3 Computer as research tool

Research has shown that computers are very useful as research tools in statistical analysis, bibliographic searches, and in data retrieval. However, at Tshedza School computers as research tools were least used and they were only used in the area of data retrieval to get information on economic and management sciences with the computer educator.

Table 4.1 The assessment of computer implementation against the matrix at Tshedza Comprehensive School

Classification	Applications	Checklist
Computers in Educational Management	❖ Budget	✓
	❖ Inventory	
	❖ Learners' records	✓
	❖ Educators' records	
	❖ Communication	✓
	❖ Computers in the library	

Computers in Teaching and Learning	**Educator/teacher-centred instruction** ❖ Computer-Assisted Instruction (a) Tutorials (b) Drill and Practice (c) Simulations (d) Instructional games ❖ Computer-Managed Instruction ❖ Computer literacy ❖ Design of instructional material (a) Word processor (b) Graphics **Learner/student-centred Instruction** ❖ Constructor of knowledge (a) Word processing (b) Graphics ❖ Information retrieval and processing ❖ Problem solver ❖ Multimedia learning and Authoring	✓ ✓ ✓ ✓
Computers as Research Tools	❖ Statistical analysis ❖ Bibliographic searches ❖ Data retrieval	

This table represents the matrix presented in paragraph 2.5 (compare) and provides an overview of the implementation of computers at Tshedza Comprehensive Primary School. The items marked by means of a right sign are the ones that are applied at the school.

4.7 DISCUSSION OF THE FINDINGS

The research findings indicate that educators at Tshedza Comprehensive School were all very excited about the presence of computers at the school and their expectations about computers was particularly positive, given that the computer was a relatively new area of interest and need in educators' armoury of teaching tools.

However, amongst seven educators interviewed, three were coming across computers for the first time at Tshedza Comprehensive Primary School, despite many years of their teaching experiences. They both taught at various schools before they came to Tshedza and in all those schools, there were no computers and there was an indication that all educators did not have computers at their homes too. It could be due to this reason that these educators were so excited about the presence of computers at this school although their expectations varied, but all expected to get more exposure and learn more about the use of computers in teaching and learning.

The variation of expectations was due to the fact that some of the educators had no experience with computers and they expected the presence of computers to benefit them exposure through staff development, hands on experience, introduction to basic computer skills and applications as well as how to use computers in the classroom, whilst educators with experience expected to benefit by enhancing their current skills and becoming more relaxed with computers because practice makes perfect.

Furthermore, the role of computers at the school was perceived positively by the management and by some of the educators. The management perceived computers to be playing very important roles at the school because there were management tasks such as budgets, communication and keeping learners' records which were carried out effectively.

Almost all the educators perceived the role of computers as integral to teaching and learning and not to be claimed as a subject, rather be treated as medium of instruction that can be used by all educators in all areas of learning. The educators indicated that the use of computers by all educators in all areas of learning for teaching and learning was of utmost importance because it would allow the computer to become part of the educator's repertoire instead of it being just a machine that allows learners to become computer literate.

Although some of the educators have such a positive and clear understanding of the role of computers in teaching and learning, they acknowledged the fact that the role of computers was ineffective at their school when it comes to teaching and learning. Computers were still being used as tools for learners' computer literacy and little for administrative tasks and were not integral part of teaching and learning.

Across the board, educators made it clear that the role of computers was unsatisfactory for them. Instead they offered a variety of reasons for their dissatisfaction such as lack of access to computers to an extent that most of the educators' use of computers has not changed since they came to this school in 1998. This implies that the level of computer knowledge of these educators was not improving in any way because of those educators who were non-users before they came to this school, were still computer illiterate, due to the relegation of computers to a single area of computer literacy for learners.

Furthermore, the research findings indicate that the relegation of computers to computer literacy caused the interaction of educators with computers to be less effective and unsatisfactory due to the fact that the majority of educators did not use computers as much as it was expected. The use of computers at Tshedza ranged from non-use, infrequent and to daily use. Three of the seven educators were categorized as non-users as they did not know how to operate a computer (switch it on or off). The other two were categorized as infrequent users because they have indicated that they use computers four times a year during examination times whilst the educator who was the member of school governing body also used them when need arises for minutes and correspondence with parents. The computer educator was the one who used computers daily with all learners of all grades for the so called "computer literacy".

In addition, the computer application that was frequently used was word processor and it appears that word processor was the most popular application, as it was used for preparing examination papers, letters to parents whilst learners of all grades used it to learn how to type their names and paragraphs for higher graders.

My initial assumptions were that educators at Tshedza Comprehensive School were not aware of the role of computers as resources which promote learning interactions with the use of interactive computer assisted lessons and other applications which give learners more choice and responsibility for their own learning. Contrary to this, the findings indicate that some of the educators were aware that the computer can be used to enhance teaching and learning with the use encyclopedia via CD-ROM and educational software that improves learners' perceptual skills, mathematics and reading skills. Although they were aware of the dynamic nature of the computer in the classroom, they were not applying their knowledge because they were not allowed access to computers.

Educators responding in this study with the exception of the computer educator who used computers with learners for computer literacy did not have access to computers at the laboratory and with the increased availability of instructional related resources such as research tools, lesson plans such as tutorials, drill and practice, recreational and educational games, information access via CD-ROMs, spreadsheet, graphics, enrichment activities etc, would have to be considered a barrier.

The research findings also indicate that the implementation of computers at the school has met with many barriers because almost all educators believed that computers were not benefiting them. Educators' beliefs about ineffectiveness of computer implementation appeared to affect them negatively. Most of the educators mentioned limited access to the computer laboratory as a barrier, they had different reasons for wanting access.

For example, three of the seven educators indicated that they wanted access to the computer room so that they could learn how to use computers and become computer literate to an extent of knowing how to use them as instructional tools in the classroom. In addition, educators perceived the implementation of computers at the school as a means of dividing, demotivating and discouraging them as members of the staff because they were not treated as equals with nonusers denied access to the computer laboratory while educators with computer literate certificates were allowed access with reservations as they were expected to get permission first from the management but with the exception of the computer educator who was allowed access without question.

The same was true with the role of computers in educational research, because educators and learners were not using computers for research and they were also not accessing information via CD-ROMs. This clearly indicates that the role of computers in educational research has not found way into the school.

Most of the educators in this study indicated that they believe that learners were also not benefiting to a large extent as they were not provided meaningful educational experiences with the implementation of computers at the school because only one area of computer literacy was dominating the role of computers at this school.

Furthermore, when assessing the implementation of computers at the school against the matrix, it was clear that there was little that computers were contributing in all applications of management, teaching and learning as well as in educational research.

4.8 SUMMARY

This chapter presented and analysed the data obtained from the interviews. However, the following categories which are: the educators' expectation due to the availability of computers at the school, the role of computers at the school, the educators' disappointment due to the implementation of computers at the school were looked at.

The educators' expectation due to the availability of computers at the school was divided by data of the following subcategories: educators were excited by the presence of computers at the school and educators expected to benefit as a result of the presence of computers at the school.

The role of computers at the school were divided into two major categories, the management's perception of the role of computers at the school as well as educators' perception of the role of computers in teaching and learning. The management perceived computers as playing a very important role at the school whilst educators perceived the role of computers as ineffective in

teaching and learning, and that computers were not used as instructional tools.

Furthermore, assessment of the implementation of computers at Tshedza Comprehensive Primary School against the matrix was done and finally, discussion of the findings was made.

CHAPTER 5 : CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

In chapter four data was presented, analysed and interpreted. In this chapter, conclusions are drawn and recommendations are made.

5.2 CONCLUSION

The aim of this study was to determine if computer availability at the school had a positive impact on the perceptions and experiences of educators about the role of computers in teaching and learning. However, the findings of this research study indicates that educators at Tshedza Comprehensive Primary School perceive the role of computers as integral to teaching and learning and cannot be claimed as a subject in itself, rather be treated as medium of instruction that can be used by all educators in all areas of learning. The use of computers by all educators in all areas of learning for teaching and learning is of utmost importance because it would allow the computer to become part of the educator's repertoire instead of it being just a machine that allows learners to become computer literate.

Although some of the educators have such a positive and clear understanding of the role of computers in teaching and learning, the role of computers is still very ineffective at school when it comes to teaching and learning. The computer is still being used as a tool for learners' computer literacy and little for administrative tasks and is not integral part of teaching and learning. The ineffective role of computers at the school is promoted by limited access to the computer room, limited computer programs and lack of relevance in as far as computer use is concerned in education.

Although some of the educators at Tshedza Comprehensive School are aware of the role that computers can play at a school as resources that

promote learning interactions with the use of interactive computer assisted lessons in subjects such as music, English and Mathematics wherein drill and practice approach can be used, thus, giving learners more choice and responsibility for their own learning. They are also aware that computers are capable of handling different tasks such as preparations, lesson plans, records of learners' achievement, portfolios, profiles and tests which they can keep for later use without redoing the whole thing which is time saving but different tasks are still not handled by computers at the school.

Furthermore, when assessing the implementation of computers at Tshedza School against the matrix/world wide, it is clear that implementation is limited in this institution. The management of the school only uses computers for budgets, communication with parents and school governing body and for keeping learners' records. In teaching and learning, little is done by computers and applications such as: computer-assisted instruction, computer managed instruction, multimedia learning and authoring, information retrieval and processing and many others are not implemented at all at the school.

In addition, computers are not implemented as research tools in statistical analysis, bibliographical searches, and data retrieval. The application that seems to dominate at the school is word processing that is used by both learners and educators. Learners use word processor to create documents whereas educators use it for examination purposes only.

Computers at Tshedza Comprehensive Primary School are not contributing to the teaching practice of educators in any way as they are not involved in their implementation at the school and computers are relegated to a single subject of computer literacy for learners. Educators' perceived the implementation of computers at the school as a means of **dividing, demotivating and discouraging** them as members of the staff because of the lack or little exposure that they are experiencing in as far as the use of this technological development is concerned. As thus, need for improvement in as far computer

implementation is very essential at the school and that is mentioned in the recommendations below.

5.3 RECOMMENDATIONS FOR IMPROVING THE IMPLEMENTATION

Based on my findings, I offer the following recommendations that may be helpful to the educators and the management of Tshedza Comprehensive School.

- The management need to have a vision of how computers should be used in every aspect of teaching and learning so that the availability of computers at the school become beneficial both educators and learners.

- The apparent lack of a supportive context that promotes basic need for access to computers, technical support, training and time to learn, kindles frustration and demotivation and ultimately engenders a sense of disappointment on the educators.

- One way management may overcome these problems is to view computers as medium of instruction thus allowing all educators access and the opportunity to have time with them, with non-users learning from peers, experienced learning from self-taught because educators as agents of change need a supportive context.

- There is a need for staff development training which should also be planned to progress from computer awareness, to operational skill, to instructional planning and integration as well as how to use the computer for research using CD-ROMs and presentation enhancement in teaching and learning so that all educators who are non-users and

users be accommodated to adapt to this technological development with confidence.

- Furthermore, management's influence and support are important factors in encouraging computer use in schools, as thus, they need to know how to apply computers in educational settings to the advantage of both educators and learners and the role of computers should not be claimed as a pure discipline or a subject in itself of computer literacy, rather it be treated as a medium or learning tool that need to be used in all area of learning in order to achieve its goal of enhancing teaching and learning.

5.4 LIMITATION OF THE STUDY

This study depends mostly on interview data, which reflects the perceptions and experiences of the educators of Tshedza Comprehensive Primary School on the role of computers in teaching and learning. The study is limited to Tshedza Comprehensive Primary School only, which cannot be considered fully representative of educators in the area. Furthermore, the study is limited to educators of Tshedza School, and as such the findings will not be generalisable to other educators other than those serving this school.

5.5 RECOMMENDATIONS FOR FUTURE RESEARCH

This study was a first step in determining educators' perceptions about the role of computers in teaching and learning at Tshedza Comprehensive Primary School. Recommendations for future research include:

- Conduct the study using a larger geographic area to compare and contrast Tshedza Comprehensive Primary School with other schools.

- ❖ Conduct the study using educators from secondary schools to compare and contrast their responses with primary educators.

- ❖ Conduct follow-up studies periodically to examine what the technology training needs will be in the future.

5.6 FINAL WORD

Evidence from this research study, undoubtedly, shows that educators at Tshedza Comprehensive Primary School are demotivated and discouraged by the set up of the school in as far as computer use is concerned. It is therefore, the task of the principal to create the strategic framework within which educators' involvement to computer use can be enhanced to ensure educators' development.

LIST OF REFERENCES

Alessi, S M & Trollip, S R. 1991: Computer-Based Instruction: Methods and development. New Jersey: Prentice Hall.

Becker, H. J & Ravitz, J. 1999 (Summer). The influence of Computer and Internet use on teachers' pedagogical Practices and Perceptions.

Bell, J.1993: Doing your research project: A guide for first time researchers in education and social sciences. Open University Press.

Berge, Z. L, and Collins M, 1997: Wired together: the online classroom in k-12. Hampton Press, Inc. Cresskill: New Jersey.

Bitter, G. G, 1989: Microcomputers in education today. Mitchell Publishing Co.

Booth, W.C, Colomb, G.G, M and Williams J.M, 1995: The craft of doing research. The University of Chicago Press.

Burke, W, 1986: Computers in the classroom .....What shall I do? Garland Publishing, Inc. New York.

Capron, H.L, 1995: Essentials of Computing. The Benjamin/Cummings Publishing Company, Inc: Redwood City.

.

Carter, R, 1993: Guide to Information technology. Great Britain: Heinneman.

Cohen, L & Manion L, 1985: Research methods in education. London: Croom Helm.

Collins J, Hammond M, Wellington J, 1997: Teaching and Learning with Multimedia. Great Britain.

Cresswell, JW 1994: Research design: Qualitative approaches. Thousand Oaks: Sage.

Dekker, E & Van Schalkwyk, O.J, 1996: Modern Education Systems. Johannesburg: Heineman.

Denscombe, M, 1998: The good research guide: Small scale social research projects, Open University Press.

De Vos, A.S 1998: Research at grass Roots: A primer for the Caring Professions. Pretoria: J.L. Van Schaik.

Dillemans R, Lowyck J, Van der Perre G, Claeys C, Elen J. 1998: New Technologies for Learning: contribution of ICT to innovation in education, Leuven University Press: Belgium.

Forcier, R.C 1996: The computer as a productivity tool in education, New Jersey: Merril.

Forcier, R.C 1999: The computer as an educational tool: productivity and problem solving, Upper Saddle River, New Jersey: Merril.

Fourie & Van der Westhuizen, 1998: Microcomputers in education, BED Module. Department of Curriculum Studies, Johannesburg: Rand Afrikaans University.

Griffin, J.D & Bash L, 1995: computers in the primary school, York House Typographic Ltd: New York.

Hannafin, MJ & Peck, KL 1988: The design, development, and evaluation of instructional software. London. Macmillan Publishers: New York.

Houghton, M 1997: State strategies for incorporating technology into education. Washington, DC: National Governers' Association.

Huberman, A M & Miles, M B, 1994: Qualitative Data Analysis, an expanded sourcebook, Sage publications, Inc: UK.

Jordan, W R, Follman, J M, 1993: Using technology to improve teaching and learning. Hot topics: Usable research. British Columbia Ministry of Attorney-General, South Eastern Region Vision for Education: Victoria.

Lofland J and Lofland L.H, 1995: Analyzing Social Settings: A guide to Qualitative Observation and analysis. Belmont: Wadsworth.

Lockard, J, Abrams, P D, Many W A, 1994: Microcomputers for Twenty-first century educators. Haper Collins College Publisher: Northern Illinois University.

Marcinkiewicz, H R, 1993: Computers and teachers: Factors influencing computer use in the classroom. Journal of Research on Computing in Education.26, 220-237.

McMillan J H & Schumacher S. 1993: Research in education. Hapercollins College Publishers: New York.

Means, B, 1994: Technology and Educational Reform: The reality behind the promise. San Francisco: Jossey-Bass Publishers.

Merril, P F, 1996: Computers in Education, Boston: Allyn & Bacon.

Morrison, G B, Lowther, D L & Demeulle, L 1997: Integrating computer technology into the classroom. Upper Saddle River: Merril.

Moursund, D 1989: Why are our colleges of education continuing to graduate teachers? The computer teacher, 16 (9).

Mouton, J 1996: Understanding Social research. J.L Van Schaik: Pretoria.

Muffoletto, R & Knupfer, N.N 1993: Computers in education: A conceptual introduction. New York: Happer Collins.

Newby,T.J, Stepich, D.L, & Demeulle, L 1996: Integrating Computer Technology in the Classroom. New Jersey: Merril.

Office of Technology Assessment, U.S. Congress, 1995: Teachers and Technology: Making the connection. Washington, DC: U.S. Government Printing Office.

Paprzycki, M & Vidakovic, D 1994: Prospective teachers' attitude toward computers. Technology and teacher educational mannual-1994. Charlottesville, VA: Association for the Advancement of Computing in Education.

Perkins, D 1992: Smart schools. Better thinking and learning for every child. New York: The Free Press.

Pettigrew & Akhurst, 1999: Learning and Teaching: Psychological perspective, School of Education, Training and Development. The University of Natal.

Picciano, A G. 1994: Computers in the schools: A Guide to Planning and Administration. McMillan Publishing Company.

President's Panel on Educational Technology, 1997: Report to the President

on the use of technology to strengthen k-12 education in the United States. Washington, DC: U.S. Government Printing Office.

Roblyer MD, Edwards, J and Havriluk, MA 1997: Integrating Educational Technology into Teaching. New Jersey: Merril.

Rubin H.J & Rubin J.S, 1995: Qualitative Interviewing: The art of Hearing Data. Thousand Oaks: Sage.

SAIDE (April) 1998: The Internet, Satellite, and the Professional Development of Educators: Building Appropriate Teaching and Learning Models. Johannesburg

Seymour, R.1993 (April). The importance of being a technology teacher. The technology teacher, 52 (7),15

Shelly, G B., Cashman, T J., Waggoner G A., Waggoner W C., 1992: Complete Computer Concepts and Microcomputer Applications, Boyd & Fraser Publishing Company. Danvers, Massachusetts

Shelly, GB, Cashman, TJ, Waggoner G A., Waggoner W C., 1997: Discovering Computers: A link to the future, World Wide Web Enhanced, Cambridge: Massachusetts.

Simonson, MR and Thompson, A, 1997: Educational computing foundations. New Jersey: Merril.

Stake, E.R, 1995: The art of case study research. Thousand Oaks: Sage.

Strauss A.L, and Corbin J, 1990: Basics of Qualitative Research: Techniques & Procedures for developing Grounded Theory. Newbury Park: Sage.

U.S. Congress, Office of Technology Assessment, 1988: Power On: New tools for Teaching and Learning, Washington, DC: U.S Government Printing Office.

Van der Aardweg E.M and Van der Aardweg E.D, 1988: Emperical Education/Educational Psychology. Arcadia: Pretoria.

Van der Horst, H and McDonald, R, 1997: OBE Outcomes-Based Education: Kagiso educational.

Van der Westhuizen, D, 2000: Information technology in education: Study guide no.81425 module 13. Johannesburg: Rand Afrikaans University

Van der Westhuizen, D 2000: Information technology in education: Reading Package no. 81436 module 13. Johannesburg: Rand Afrikaans University

Wetzel, K., 1993: Teacher educator's use of computers in education. In Carey, D, Carey, R, Willis, D & Willis J (Eds),Technology and teacher educational mannual. Charlottesville, VA: Association for the Advancement of Computing in Education

Zorkoczy, P. 1985: Information Technology, Introduction. London: Pitman Publishing Limited

APPENDIX 1

Dear Sir

Please follow the steps below to analyse the data of the transcribed interviews:

1. Read through all the transcriptions focusing on the experiences and perceptions of educators at Tshedza Comprehensive Primary School.
2. Identify the major categories represented in each universum as you read through the transcripts.
3. Underline units of meaning that are related to identify major categories.
4. Identify subcategories within the major categories.
5. Identify interrelationship between major categories and subcategories.

Thank you
R.L. Netshizwa
M.ed. (Computer based Education)

LEARNING AT TSHEDZA COMPREHENSIVE PRIMARY SCHOOL
(Translated in Tshivenda)

1.Researcher: "Please tell me about your experience with computers at home or elsewhere besides here at this school."

Educator : "Hmm.....you must be joking, we are living in the rural areas and for me to use a computers were will I find it because some of our areas and most schools do not have electricity."
Educator : Interrupting ,"Eh... this is a difficult question, because computers are very new to us ....never came across them, even at the colleges where we were trained."
Educator : "Hmm.....I like challenges, that is why I decided to enrol for a computer literate diploma after realising that there is no way that I can get myself to know how to use a computer as I do not have it home...eh...it is very difficult to buy yourself a computer especially if you do not know its importance."
Educator : "You know I also felt that it is better if I get learn myself how to use a computer and I went to this institution where I got myself a computer literate certificate. That is where I got experience of using computers and I like them very much."
Educator : "Hmm.....we are at the disadvantaged area, we only see a computer on television, never touched it and let alone to know how to use it."
Educator : " A friend of mine who lives in the urban area at Pretoria told me about the potential of computers in such a way that I wanted to have first hand experience on them and that is why I have a computer literate certificate."

2. Researcher: "Please tell me about your experiences with computers here at this school."

Educator MB: " Yeh,....to me it was a dream come true. I always enjoyed working with computers but had little opportunity of using them as I would like at the previous institution that I was working, so being at Tshedza, the responsibility of introducing all learners of all grades is given to me and it is the best challenge ever. It is fun and I also get the satisfaction of seeing excitement in my learners when using computers at the computer centre".
Educator SG: Eh...interrupting MT, (tape inaudible for two words) to be honest, I don't know anything about computers, I taught in many schools before and there were no computers. So when I arrived here I was very excited to find that there are computers and I thought that I am going to learn to use them to an extent of using them with my learners ...but now..... hmm ..things are difficult.
Researcher: Ehe
Educator NM: Hmm....I am acquiring knowledge of using computers as I am very fortunate to be chosen to attend Shoma project at Ramaano Mbulaheni in-service training centre where I am getting exposure and experience with the world of computers but the problem is I do not have any other place to practice what I have learnt there because at school, computers are meant for learners and the computer educator who hold the keys to the computer centre.
Educator MK: I come from schools with no computers and now here at this school I expected to learn the basic skills of computers, have a taste of how is like using computers but, hmm ..... things are not as I have expected them to be and to be honest I am very disappointed.
Researcher: Ehe
Educator RB: I have some experience with computers that I have acquired from the institution where I received training for my computer literacy certificate. Here at this school I wanted to refresh my memory about computer

applications such as spreadsheet, Microsoft powerpoint, word processor and many others.

3. Researcher: "Please tell me about your perceptions of computers."

Educator MT: I think that computers are great and they are good for learners. It is fun to teach learners computers, hmm.....learners enjoy working with computers and I also get the satisfaction of seeing them happy.
Researcher: Mh.
Educator DV: " I was so happy to be at this nice school with laboratories and computers, hmm.....for I never used the computer in my life and now being at a school with computers was great but now things are not the way I expected hmm....we only see computers at a distance and only those with certificates are allowed to use them...".
Educator MK: ".....It's worse I do not even know how to switch on/off a computer.....and.....I thought we are going to be trained how to use a computer but now.....only those with computer certificate are allowed to use them.
Educator RB: Eh..... interrupting MK, I think that we all have problems with computers at the school because even if you have a certificate you only go to the computer centre with permission and.....it is boring to do that and I end up not going....hmm.....I feel discouraged.
Educator NM: "I think that computers are great and being at a school with computers, I wanted to practice more in order to develop increased confidence and enthusiasm about them to an extent of using them with my learners in the classroom to enhance teaching and learning as I was not coming across computers for the first time but.....".
Educator B: I was very happy to find myself at a school with laboratories and more especially computers, they are new to me because my previous schools had no computers and I was very excited about them. I even thought that I am

going to learn to use them to an extent that I can use them with my learners and now things are not the way I expected.

4. Researcher: "Please tell me how computers are used at this school."

Principal: "Computers form part of our school curriculum and their most important role is to help all learners of all grades to become computer literate because computer literacy is treated as a subject at the school and we have the computer educator who equips them with the necessary skills and knowledge".

Educator ML: " I am a member of school governing body and I am delegated to perform many tasks to an extent that I find myself using computers more often for preparing minutes of the school after every meeting, letters to parents, and to me computers are playing a very important role which saves time and energy because instead of writing many letters to parents only one letter is made to become many by printing".

Educator SG: " I do not see much of what the computers are doing at the school except that they are dividing us because learners and the computer educator are the ones who are benefiting from them whilst we are left in the dark.

Educator DV: Ah.... Don't make me laugh, I have never touched a computer since I came to this school in 1998. I only see them at a distance and now I am no longer interested in them. I am like any other educator who is working at a school with no electricity or computers for that matter.

Educator MK: Interrupting educator, to me computers do not exist at this school, may be to those who are allowed to use them but.....eh.....this situation...it is like when I was at those schools with no computers. There is no change as we are not getting any exposure to these machines. To me even if they can take them away I cannot feel any difference.

Principal: " Computers are very effective in handling information such as learners' records of registration and payments and in this way we are able to trace our records fast and easily".

Researcher: Hmm

Educator SG: You know no one taught me how to use my sewing machine, I am not afraid of challenges but now....., I am no longer interested in these computers because I only see the computer educator and learners working on them and some of those with computer literate certificates. At first I thought we are also going to be trained or taught by the computer educator so that we are not left in the dark about this new technology but.....things are different.

Educator RB: Interrupting educator E, hmm.... I think that if an educator is interested in learning about computers that person should ask the computer educator to make time to teach him/her how to use computers after school.

Educator MB: (Inaudible for a while) showing concern, it is easier said than done, I don't think that could be easy for me because after school I am tired and I also have some other things to do.... hmm.... besides even if there was time I could not teach them without permission from the management.

Principal: "Hmm ..... computers also enables us as a school to communicate with parents and school governing body easily because one typed letter is printed to many letters that can be distributed to all of them thus saving time".

Educator B: " Hmm..... computers are very important to learners as they become computer literate and be up to date with the technological development of today. Learners are able to write their names and paragraphs with computers".

Researcher: Hmm....do you think so.

Principal: " Ja, these machines are playing a very important role during examination periods because we are able to prepare our question papers in time and prevent our examination from leaking, this is one of the problems that we used to experience in the past as we had to take our question papers to the local people at the shopping complex with computers who type for payments".

5. Researcher: "Please tell more about your perception of the role of computers at the school"

Educator RB: " Hmm.....computers are not used as tools like pen, pencil and paper at this school. They are not allocated for classroom use with learners and let alone to take learners to the computer room because they are not meant for enhancing teaching and learning as medium of instruction"
Researcher: Ehe.
Educator MB: "Hmm...computers are mostly used by myself as the computer educator with learners for computer literacy and they are very good as they prepare learners for tomorrow's world but I have a problem of programs they are not enough and when I am supposed to teach grade Rand 1 learners to use mouse when playing games and I end up teaching them how to type their names with Microsoft word because there are no games programs in our computers".
Educator RB: Interrupting MB, " I do not see much of the role computers at the school. I wish we can do more with this machines like presenting learners' with assignments but that is not the case, I only see computers assisting in making examination papers ready for learners during examination period".
Researcher: Ehe
Educator NM: " Computers are more effective during examination times, which means that they are used productively four times a year, as we have examinations quarterly at this school and in this way teaching and learning is not influenced by them as medium of instruction which can be fun for learners to interact with".
Educator SG: "I would say the use of computers at this school is predominantly not effective, not at all. I think the reason is that the role of

computers in this school are seen as a pure discipline, that is, computer literacy and not as instructional tools".

Educator ML: "You know what, hmm....I think that computers are playing a vital role at this school because our learners are getting enough exposure of this technological development computers are treated as a subject of computer literacy and are better prepared for the job market in the future".

Educator NM: "Ey .... I see computers are not used as a teaching tools that can be used by all educators in almost every subject but kind of computer literacy thing which involves only learners and the computer educator because we are sidelined at the school".

6. **Researcher: Please tell me how you would use computers if given the opportunity**

Educator ML: "I see that computers can play very useful roles as instructional tools for instruction and introduce learners to other computer applications which can improve learners reading skills such as in English and in many other areas of learning and I think that computers could be used in a variety of subject content areas in a variety of teaching and learning strategies to increase the efficiency and productivity into the school environment, thus enabling us to use computers as an instructional medium and as a problem solving tool in mathematics".

Researcher: Ehe

Educator NM: "I think I can use informational encyclopedia in my subject to create an effective learning environment for my learners to understand complex issues such as volcanic eruption, seeing it happening on the computer screen can be fun and interesting"

Educator RB: "computers can assist learners in some of their lessons to save time by grouping notes that find the incorrect notes easy and faster than doing it manually which is very time consuming ...eh the other problem is that there are no relevant programs in these computers ".

Researcher: Mh

Educator RB: " I would also like to do my preparations, lesson plans, and set test on the computer so that I can save my work and be able to use it next time, even changing here and there when need be but not redoing the whole thing".

Educator NM: "If I had access to computers I could keep my learners records of achievement on the computer more especially now that in Outcome Based Education every learner should have a portfolio and a profile, with the computer it could be time saving and efficient to keep those records".

Educator ML: " If I had access computers I would use them in a lot different way, I think I would use the end of it, like the presentation end such as drawing maps, giving assignments and class notes, give learners the opportunity of producing things on their own, thus enhancing their creativity".

Educator MB: "It is not fun to work on computers with grade R and 1 learners on Microsoft word only, I would prefer it if I had programs such as games that can be enjoyable to them".