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The educators’ perspective of the factors that influence the success of ICT School Initiatives within the Western Cape

A Dissertation presented to the

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By

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Abstract
A critical shortage of educational resources is one of the major challenges that the South African Education Department is currently faced with. The lack of educational resources becomes more significant when you compare disadvantaged schools with limited educational resources to more affluent schools where educational resources are more readily available. The lack of educational resources extends to include the limited access to Information and Communication Technologies (ICTs) which is one of the reasons for the growing digital divide found between disadvantaged schools and the more affluent schools. The formation of the Khanya project was an attempt by the Western Cape Education Department (WCED) to address the need for ICT resources by those schools that were not in a position to acquire their own ICT resources. Vast financial resources have already been invested in the project, and continued financial investment in the Khanya project only makes sense once the factors impacting on the success of the Khanya project are identified.

The case study focused on the Khanya project, with an investigation into those factors that influence the implementation and the use of ICTs for curriculum delivery. The investigation was from the perspective of the educators who are tasked with using ICTs as a teaching tool within classrooms during curriculum delivery. The study used the Motivation-Hygiene Theory as a framework to identify those factors that motivate and hinder the successful implementation of ICT initiatives in the Western Cape schools. Since the focus of this study was an investigation into the behaviour of educators within a school setting, a qualitative research approach was best suited for this study. Data for the study was collected using face to face, in-depth interviews with ten educators from high schools in the Cape Town area, a representative of the Khanya project and a representative of an organisation that trains educators in order to use the Khanya lab. The study highlighted the following factors as being important when it comes to the success of ICT school initiatives: educators integrating the use of ICT resources during curriculum delivery; the relationships amongst educators using the Khanya lab; the level of responsibility educators take for self-development when it comes to the Khanya lab; the achievements educators have when using the Khanya lab; the working conditions in the Khanya lab; school policy and administration that impact on the use of the Khanya lab and the personal impacts on both educators and learners who are using the Khanya lab. One of the benefits of the study is that it highlights and discusses the challenges faced by educators when using ICTs for curriculum delivery. This information can be used by Khanya, the education department and the school management to actively engage with educators on the issues identified, and together find solutions to the challenges.
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1. Introduction
The information revolution has brought along great opportunities for development (Beute, 2003). Developing countries would seem to be the ones who would benefit the most from accessing these development opportunities. However, developing countries in Africa have not readily been taking up these development opportunities. Some of the challenges impacting on the level of uptake are: the lack of funds to access Information and Communication Technologies (ICTs); the lack of infrastructure within the country to enable ICTs; the high cost of internet connections; limited ICT skills and the lack of an enabling policy environment (SchoolNet Africa, 2001).

Even though there are challenges, the African leaders are committed to fast-tracking development on the continent. The pledge made by African leaders to the New Partnership for Africa’s Development (NEPAD) highlights the commitment and the desire of African leaders to see real development take place on the African continent (NEPAD, 2005). The objectives of NEPAD are to minimise the levels of poverty in Africa and bring about the sustainable growth and development of African countries. In order for the African countries to achieve sustainable growth and development, they need to be active participants in the world economy. Two cornerstones identified by NEPAD that underpin African development are education and ICTs. In order to bring about the sustainable development of the African continent it is of paramount importance to bridge the education gap and the digital divide (NEPAD, 2005).

Commenting on the themes expressed by NEPAD, Ong (2002) states that in order to have access to, and to produce and share information and knowledge, it is important to master the ICTs which are used to access the available information and knowledge. Nowadays people, who cannot master the available ICTs, run the risk of being excluded from their society and global community via the digital divide. The digital divide can be defined as:

\[ \text{the gap that exists in most countries between those with ready access to the tools of information and communication technologies, and the knowledge that they provide access to, and those without such access or skills. This may be because of socio-economic factors, geographical factors, educational, attitudinal and generational factors, or it may be through physical disabilities (Cullen, 2001, p. 311).} \]

In South Africa, ICTs are also seen as a development tool to redress the inequalities of the past, where inadequate education opportunities led to a large percentage of South Africans being ill-equipped to meet the new demands placed on them by the information society. Government and the business community in South Africa have identified ICT as one of the catalysts to bring about the up-skilling of these South Africans. The benefit for the Government is meeting the goals set out in the
Accelerated Shared Growth Initiative for South Africa (AsgiSA) and for business it is the generating of relevant skills needed for business growth and sustainability (Akoojee, Arends & Roodt, 2007). In order to address inequalities such as the limited educational resources found in disadvantaged schools in South African, the South African Department of Education (DoE) believes that the use of ICTs in transforming the formal education sectors are critical. The Khanya project is an example of a government ICT initiative currently operating in the Western Cape Education Department (WCED) (DoE, 2004; Khanya, 2008a; WCED, 2003).

There is much excitement about the Khanya project and its ability to address the ICT development needs within schools. However, the success of the project is not guaranteed. Khanya (2008a) agrees that educators play a central role in the successful implementation of ICT initiatives in the Western Cape schools. The literature, however, highlights that educators face many challenges in the classroom which ultimately lead to educators feeling dissatisfied with their role as educators. In order for the Khanya project to be successful in delivering its promise to transform the formal education sector through the use of ICTs (DoE, 2004; Khanya, 2008a; WCED, 2003), it becomes essential to identify the issues that lead to educator dissatisfaction. The purpose of this dissertation is to identify factors that motivate or hinder the successful implementation of the Khanya lab into the schools of the Western Cape.

1.1. The Research Purpose

Educators play a central role in the successful implementation of ICT initiatives in the schools of the Western Cape (Khanya, 2008a). Success of the Khanya project is dependent on the educators being motivated about the opportunity of using ICTs in their classrooms. The literature confirms that educators who are motivated, who have high levels of morale and who are satisfied with their jobs as educators also deliver an improved quality of education. The literature, however, also highlights the fact that educators face many challenges in the classroom – these impacts on their levels of morale, motivation and job satisfaction.

Job satisfaction refers to “the degree of satisfaction a worker evinces for the work in which he or she is engaged” (Fuming & Jiliang, 2001/2007, p. 87). Employees of an organisation will mostly stay and continue to work for the organisation if they are sufficiently satisfied with the work itself and the environment in which the work is conducted. When these workers become dissatisfied with work, they will either leave or conduct themselves badly at work. This drop in performance by a worker in his/her work will negatively impact on the quality of work delivered (Fuming & Jiliang, 2001/2007).

Exploring the issue of teacher job satisfaction would lead to an in-depth understanding into what educators think. The mental state of teachers will affect the quality of the education and teaching (Fuming & Jiliang, 2001/2007). Educators facing challenging conditions in using ICTs as a teaching
tool within their classroom to deliver the teaching curriculum will struggle with their levels of morale and motivation and this can lead to an increase in job dissatisfaction.

Dissatisfied educators can seriously impact on the levels of success that the Khanya project will achieve. In order to improve the levels of success relating to the implementation and use of ICT initiatives, it becomes essential to determine those factors that impact on educators using ICTs within the classroom. The purpose of the research was therefore to gain an understanding into the challenges and opportunities arising from the implementation of ICT initiatives in the Western Cape schools and to describe the factors identified by the educators that either promote or hinder the successful implementation and use thereof.

1.2. The Relevance of the Research and Expected Contributions

Research into the factors that impact on job satisfaction amongst educators is increasingly becoming relevant and receiving much more attention due to a decrease in status and popularity of the teaching profession (Gendin & Sergeev, 2002). In many countries, there has also been a marked increase in the educator turnover rates recorded over the past few decades (Kottermann, 2000). Educators are also under constant pressure to achieve educational objectives that are constantly raised, and to deliver better quality results on a continual basis. The demands and constant changes to the environment put teachers under constant stress and pressure - this makes the investigation into the factors that impact on educators within their work situation increasingly important and necessary (Badenhorst, George & Louw, 2008).

The constant stress and pressure within the teaching environment will have a negative impact on the educator. The impact will be felt in the levels of morale and job satisfaction expressed by the educators. The levels of teacher morale found within a school also influence the quality of teaching at the school. In order to understand how a teacher’s morale impacts on the quality of teaching, research is needed to identify those factors that influence the morale of teachers. The factors influence the teacher by shaping their feelings in relation to job satisfaction and dissatisfaction. Once these factors have been identified, it becomes possible to motivate and mobilise the teachers and effectively put back the enthusiasm and excitement of teaching (Bolin, 1996/2007).

It is believed that this research will be of value to government institutions, researchers and other organisations involved in implementing ICT initiatives within schools as well as contributing to the body of knowledge relating to this matter. The South African Government and, more importantly, the WCED, is a major stakeholder in the Khanya project with a substantial financial investment of R 341 million invested in the Khanya project (Khanya, 2008b). The continued investment into the project makes sense only if the factors affecting the success of the Khanya project are firstly identified and
addressed. The success of the Khanya project is being viewed in terms of the levels of motivation and job satisfaction of educators using ICT resources in teaching. This research attempts to unpack the issues and contribute to the debate.

The results of the research can also be used by the Khanya project to understand the factors impacting ICT school initiatives. Although the study was specific to the Western Cape, the findings have a broader significance and could be used by other provincial educational departments in South Africa. Corporate organisations wanting to invest in ICT school initiatives as part of their social responsibility could also find the results valuable. ICT initiatives are global phenomena and the research results could add value to emerging countries in Southern Africa, extending throughout Africa and to other continents where ICT school initiatives are being planned or are currently operational.

1.3. Research Questions
Based on the purpose of the research, the following research questions are posed:

Primary Research Question
From the perspective of educators, what factors influence the success of ICT school initiatives in a school?

To answer the Primary Research Question the following secondary research questions needs to be answered:

Secondary Research Questions
1. What factors motivate job satisfaction in terms of using ICT technology in curriculum delivery?
2. What factors hinder job satisfaction in terms of using ICT technology in curriculum delivery?

1.4. Overview of the chapters in the thesis
Chapter 2
The literature review identifies the important academic and professional thinking on ICTs and their use in education. The focus of the current study is on the Khanya project and therefore the literature review starts by introducing the Khanya project as an ICT initiative in the WCED. The sections cover the historical background, the purpose, the goals and the roles that the Khanya project fulfils as a supporter and facilitator to the Khanya schools.

Next, the literature review introduces the concepts of teacher motivation and job satisfaction - identifying the factors that influence teacher motivation and job satisfaction and the impact they have
on the school environment. The literature review then becomes more specific in discussing the use of ICTs in education and the factors influencing the use of ICTs in education.

Chapter 3

This chapter discusses the theoretical frameworks that have been used in studies on teacher motivation and job satisfaction. Research theories that are discussed are: the job satisfaction (Hoppock, 1935), Maslow’s Hierarchy of Needs Theory (Maslow, 1943), Herzberg’s Motivation-Hygiene Theory (Herzberg, Mausner & Snyderman, 1959), Social Cognitive Theory (Bandura, 1986), Theory of Planned Behaviour (Ajzen, 1991) and Teacher Self-efficacy model (Hoy, Woolfolk-Hoy & Tschannen-Moran, 1998).

Chapter 4

This chapter develops a basis for using a qualitative research approach in the current study. The chapter outlines the different research methodologies and then continues to explain why a qualitative, interpretative research approach is best suited to answer the research questions posed. The chapter also defines the principles of case study research and provides the motivation behind selecting the case study approach for this study. Interviews were seen as being the most suitable research instrument for the study. The coding technique of data analysis was used to analyse the data collected (Corbin & Strauss, 1990) and the principle of theoretical saturation was used during data analysis (Eisenhardt, 1989). The chapter further outlines the steps taken by the researcher to ensure the confidentiality of the study and also the limitations of the study.

Chapter 5

The purpose of this chapter is to provide a case description of two schools in the study. The chapter covers areas such as: a brief description of the schools, the number of educators at the school, the number of learners at the school, the type of ICT resources at the school, what the ICT resources are used for and an introduction into the impact that the Khanya lab had on the school.

Chapter 6

The focus of this chapter is on the motivational factors when using ICT resources in teaching. Out of the data collected, the key categories and themes are identified and then defined (Corbin & Strauss, 1990). The categories and themes explain the impact of the motivational factors on the success of ICT initiatives in Western Cape schools.
Chapter 7

The focus of this chapter is on the hygiene factors when using ICT resources in teaching. Out of the data collected, the key categories and themes are identified and then defined (Corbin & Strauss, 1990). The categories and themes explain the impact of the hygiene factors on the success of ICT initiatives in Western Cape schools.

Chapter 8

This chapter identifies and discusses the relationships amongst the categories identified in Chapters 6 and 7. The discussion describes those factors that have a positive or negative impact on these relationships and how these relationships impact the success of ICT initiatives in the school.

Chapter 9

This chapter discusses the recommendations that could be implemented in order to address the challenges highlighted in Chapters 6 and 7. These recommendations are an attempt to improve the success rate of ICT initiatives in schools. The chapter will also recommend future research opportunities into the integration and use of ICTs within schools.

Chapter 10

This chapter draws conclusions on the discussions had throughout the study on the factors that either motivate or hinder the success of ICT initiatives in schools. The focus of this concluding discussion is on answering the research questions posed by the study, and also to highlight the implications of the study.
2. Literature Review and background

2.1. Introduction

The role of education is essentially to provide learners with the necessary skills needed to fully participate in building the national economy of the country. One of the essential skills needed to be successful in the 21st century is that of being computer literate. There is, therefore, a need to introduce as well as to develop the ICT skills of learners. The DoE identified the potential of having an ICT initiative within schools which subsequently led to the establishment of the Khanya project in the WCED. The chapter starts off by describing the structure of the South African Education Department and the impact that past educational policies had on the educational system. Section 2.3 presents a historical background of the Khanya project and how the Khanya project fits into the South African Education System. This section then goes on to discuss the relationship between the schools and Khanya, and the support services provided to the schools by Khanya. Section 2.4 becomes more specific in focusing on the factors influencing the use of ICTs in education. The success of the Khanya project is also dependent on the educators at the school and whether these educators are motivated when it comes to the use of ICTs in curriculum delivery. Section 2.5 introduces the concepts of teacher motivation and job satisfaction, and identifies the factors that influence teacher motivation and job satisfaction and the impact they have on the school environment.

2.2. The South African Education System

2.2.1. Structure of the education department

The South African education system comes from a past where the inequalities of apartheid led to disadvantaged schools receiving limited educational resources and having a lack of suitably qualified educators. This has led to a large percentage of South Africans receiving inadequate educational opportunities and being ill-equipped for life after leaving school (Akoojee et al., 2007; Du Toit, n.d.).

The schools in South Africa are run by the provincial governments and each of the nine provinces has its own education department (Provincial Education Departments, 2009). A provincial department of education (PDoE), such as any provincial department, is headed by a Member of the Executive Council (MEC).

During the period of 2006 and 2007, the WCED went through a major restructuring which resulted in eight education districts and 49 circuits. The reason for the restructuring was to enable the WCED to deliver to the Human Capital Development Strategy which formed part of the Growth and Development Strategy. The circuit teams are responsible for providing schools with professional support in an advisory capacity. Their role is to advise schools on school administration, on general education and training needs, as well as specialised needs such as school psychologists, social workers and other learner support needs. The districts were established based on the local government
boundaries in the province. The reason for this was to provide an “integrated approach to service delivery” to all schooling areas in the province (WCED, 2008).

The function of the education district is to support schools, educators and learners in terms of management, governance and curriculum matters (WCED, 2009). Section 8 of the School Education Act 6 of 1995 (Act 6 of 1995, 1995) defines an educational district and region as:

*The Member of the Executive Council may divide the area of the Province into educational regions, and each such region into educational districts, for the purpose of the administration of matters relating to education in the Province. The Member of the Executive Council may amend the boundaries of any educational region or of any educational district.*

The Western Cape Province is divided into eight educational districts: Metro Central, Metro East, Metro North, Metro South, Cape Winelands, Eden and Central Karoo, Overberg and West Coast (WCED, 2009). Figure 2.1 is a schematic representation of the eight districts in the WCED.

![Figure 2.1: Education Districts in the WCED (WCED, 2008)](image)

The Head Office of the WCED is currently situated in Cape Town and the role of the office is to develop policies related to education in the Western Cape, and to coordinate, monitor and evaluate these policies. The office also plays a role in educational research (WCED, 2008). Appendix A provides an Organisation structure of the WCED.

In South Africa the school system consists of 12 grades. Attending school is compulsory for learners when they turn seven and continues until they reach Grade nine or the learner turns 15 years old. This phase of education is known as General Education and Training (GET). Learners receive a GET certificate at the end of Grade nine. This GET certificate is equal to level 1 on the National
Qualifications Framework (NQF) (Capegateway, 2004a). The NQF qualification is defined as a "Nationally recognised qualification that meets the standards and requirements set by SAQA" where SAQA refers to the South African Qualifications Authority (Capegateway, 2004b). Grades 10 to 12 make up Further Education and Training (FET) and these grades have equivalent NQF levels from two to four. These grades also have equivalent levels in the FET colleges (Capegateway, 2007). The education system in South Africa also provides a programme for adults who in their later life decide to finish their basic education. The programme is called Adult Basic Education and Training (ABET). The content provided in the programme covers Grades R to nine (Capegateway, 2006).

2.2.2. Past school language policies and their impact on the South African Education System

The South African education system comes from a past where English and Afrikaans were given preference over the indigenous languages of South Africa as the preferred languages for teaching and learning. The preference given to English and Afrikaans meant that the indigenous languages were marginalised and were not able to become fully integrated into the South African education system (Olivier, 2006). In order to address this imbalance, the DoE in 1997 adopted the Language of Education policy. The purpose of this policy was "to promote multilingualism" in South African schools and to provide an equal opportunity to all eleven official languages in South Africa. Two of the aims that the Language and Education policy wanted to achieve were "to promote and develop all the official languages" and "to pursue the language policy most supportive of general conceptual growth amongst learners, and hence to establish additive multilingualism as an approach to language in education" (WCED, 2007). The school governing bodies have the right to decide the language of instruction for their schools.

2.3. The Khanya project

The purpose of the Khanya project is to assist schools in the Western Cape with acquiring ICTs for curriculum delivery. The belief is that this transformation in education will equip South Africans with new capabilities needed to access and master knowledge and information, effectively starting to address the digital divide concerns in the country and, more specifically, in schools found in the Western Cape (Khanya, 2008a). As mentioned in the previous section, the PDoE is responsible for the GET, FET and ABET in the Western Cape (WCED, 2009). The Khanya project supports both the primary and secondary schools i.e. the Khanya project supports schools at the GET and FET levels (Khanya, 2008a).

2.3.1. The beginnings of the Khanya project and its latest progress statistics

On the 1st of April 2001, on the authority of the Provincial Government Cabinet, the Khanya project was launch as an initiative of the WCED. The word Khanya comes from a Xhosa verb "ukukhanya" which means to brighten or to enlighten. The mandate of the project was to make technology accessible to all learners and educators in the province by the year 2012 (Khanya, 2008a). The
business plan of the Khanya project outlines the project’s goal which is "to promote learning and maximise educator capacity by integrating the use of appropriate, available and affordable technology into the curriculum delivery process" (Van Wyk, 2002). Initially the project concentrated on assisting disadvantaged schools with limited educational resources to acquire ICTs in order to deliver the teaching curriculum. This focus is gradually widening to include all schools in the province.

One of the major deliverables of the Khanya project is to address the digital divide that exists between the schools in the Western Cape. Achieving this deliverable will improve the possibilities available to both learners and educators of using modern technology (Gudmundsdottir, 2008; Khanya, 2008a; WCED, 2003). To date a total of R 341 million received from state funding has been spent on the Khanya project since its inception in April 2001 (Khanya, 2008b). The Khanya project has also made several partnerships with donor organisations such as the Board of Executors, CSIR, Old Mutual, Telkom and other organisations who contribute to the success of the Khanya project (Khanya, 2008c).

Statistics provided by the Khanya project shows that 59% of schools have a computer lab, 11% of these schools are being facilitated, 70% of educators are trained or are being trained and 71% of learners currently have access to ICT in their schools. The Khanya project is extending its reach and playing a project management role in other educational projects such as the Mindset project, Focus School project, Geography GIS project and the Rubricate Assessment Tool project (Khanya, 2008b). Studies show that the Khanya project is having some successes. Two studies conducted to measure the levels of success resulting from the intervention of the Khanya project into schools are:

- the Primary School Project whose aim was to support learners to improve their numeracy and literacy skills
- the Mathematics Higher Grade Project whose aim was to support learners in improving their Mathematics results

The overall findings of both projects show a positive correlation between the ICT intervention in curriculum delivery and an improvement in the overall skills of the learners (Du Toit, n.d.).

2.3.2. The process of selecting a Khanya school

The large financial investments made by the Khanya project into the ICT school initiatives place a strong emphasis on making these ICT school initiatives a success. The importance of making a success out of these ICT school initiatives was highlighted in the interview conducted with the Khanya representative who said:

when we started in 2001 the cost was approximately R500 000 and if you making an investment of R500 000 you want to make sure that that is going to be sustainable, so your selection process would be to make sure first of all that you have very good management in place, it is
going to have a reasonable chance of succeeding and that it is going to be sustainable [Khanya Rep]

The Khanya representative also expressed the importance of the school selection process and what criteria were important to improve the success rate of their investment:

you are obviously choosing the best and better schools first, however one of the criteria was that we would start with the poorest of the poor schools because of the huge digital divide that there was in 2001, to bridge that gap you actually have to start with the poorest of poor, but it's got to be well managed. We didn't want to throw technologies as of the nature we had, really state of the art stuff at schools that already had it, so schools were chosen who had nothing, but had a very good chance of succeeding, good management, good security a chance of sustaining [Khanya Rep]

Since the Khanya office was not in a position to determine which schools best meet the selection criteria, this decision was left to the DoE who had an ongoing working relationship with the schools:

so we leave it up to the district officers, the circuit managers, they know whether there is good management in the school, whether there are disciplinary problems, whether there are financial issues, whatever the case may be, so the district office chooses [Khanya Rep]

2.3.3. The language policy in South African schools and its impact on the Khanya project

From the perspective of the Khanya project, the eleven official languages used in education make the development of educational software, which is localised and has content that is relevant from a South African perspective, a challenge. The importance of assisting educators in identifying relevant educational software that can be used within the classroom is essential for the success of ICT educational projects (Cuban, 2001). To overcome this problem, the Khanya project created a content development team that was tasked with the identification of suitable software, to pilot it and even take part in the designing and development of educational material that suited the South African educational curriculum and climate (Du Toit, n.d.; Khanya, 2008a).

Gudmundsdottir’s (2008) study included the focus of how the language of instruction might influence the learner’s skills and use of computers. The study was conducted in three Khanya schools. The schools had a mixture of learners with home languages of English, Afrikaans and Xhosa. The findings showed that educators preferred to use educational software that is in English. The common theme expressed by educators is that the software is “easier for them”. On the other hand, the learners preferred that the educational software and the content be in their own mother tongue. For South Africa to achieve true educational equity, each learner should have the right to be taught in his/her own mother tongue. Localisation of educational content is essential. Without localising the
The educators' perspective of the factors that influence the success of ICT School Initiatives within the Western Cape

educational content, English will remain the dominant language in South Africa. The irony is that Khanya is a Xhosa word, however, limited resources in Xhosa are available to learners (Gudmundsdottir, 2008).

2.3.4. Operational framework of the Khanya project and challenges

The Khanya project operates on the following five principles (Khanya, 2008a):

1. Technology should not be seen as the driving force, but as an enabler to assist the WCED in its core business and that core business is the delivery of the curriculum. The Khanya project must first be seen as an educational project and secondly as a technology project.
2. Each school should be seen as a unique entity and this means that the project would need to adapt to the specific requirements of the institution.
3. Community involvement and support are essential ingredients needed in order to make the project a success now and in the future.
4. Partnerships with other internal public structures, at departmental, provincial and national levels, as well as with corporate and donor organisations are essential for delivering a successful project.
5. ICT training is essential for the educators. Without proper ICT training and empowerment of educators the Khanya project will not succeed.

Technical self-sufficiency and sustainability are two additional factors that have been identified as playing a role in the future success of the Khanya project. Sustainability is a complex area in the Khanya project and the following four areas have been identified (Khanya, 2008a):

- Financial sustainability is focused on the running costs incurred by the computer facility. These costs include the upkeep, maintenance and the replacement of old computers.
- Technical sustainability is focused on having technical staff and educators who have been sufficiently trained, in order to successfully use the computer labs. This leads onto the point of being technically self-sufficient.
- Operational sustainability is focused on having the computer labs used for their intended purpose of curriculum delivery and, not becoming neglected and losing all its potential as a learning tool.
- Environment sustainability is where the focus is on using energy wisely, as well as having an environmentally friendly policy for disposing of obsolete computers.
2.3.5. Facilitation, training and support on the Khanya project

Two important components of the support Khanya provides to the schools towards the use of ICT for curriculum delivery are (1) facilitating and (2) training. Khanya facilitators play a central role in supporting schools that have become part of the Khanya project. The facilitators are ex-teachers with extensive teaching experience. The facilitators support the management, teachers and learners in the use of the technology for teaching and learning. The support is meant to ensure long-term success of the Khanya project (Du Toit, n.d.; Khanya, 2008a).

Bingham and Byrom (2001) as well as SHAWCO (2001) agree that support and teacher training is vital to bring about the successful integration of ICTs into the educational environment. SHAWCO (2001) found that computers are not being used in certain schools due to the fact that teachers are not skilled to use the technology. Bingham and Byrom (2001) found that ICT projects are successful in the long run, if the focus at the beginning of the project is on teaching and learning and not on hardware and software. A positive attitude toward ICTs and gaining the buy-in from the management and teachers in the school are crucial to the success of ICT projects (Du Toit & Petrie, 2001). Ease of access to professional training will assist in creating a positive attitude toward the use of ICTs in the classroom.

Hands-on and face-to-face teacher facilitation is conducted between the Khanya facilitator and the teacher receiving the training. The focus of the training is on achieving particular curriculum outcomes. The training may be adjusted depending on the level of prior ICT learning that the educators have had. The integration of ICT into teaching, and the use of educational software in delivering the teaching curriculum, occurs simultaneously with the ICT skills training. Once the formal training is complete, initial support is provided to the teachers in the classroom, in order to encourage the use of their new ICT skills within the classroom in curriculum delivery. This exercise is also seen as a confidence builder for the teachers. Once the teacher and the school as a whole are comfortable with using ICTs in the classroom, the onsite support is gradually removed. Visits by the facilitator to the school become less frequent and the school ultimately becomes independent (Du Toit, n.d.).

Facilitator support is not completely removed. In an event of a crisis, the school can contact the facilitator for assistance (Du Toit, n.d.). The schools are also supported by a Local Area Network (LAN) Administrator. LAN Administrators in terms of the Khanya project are educators who receive additional technical training, referred to as LAN Training, in order to support the Khanya lab on an administrative as well as a technical level. This additional technical training is provided by the Khanya project. Once trained, the LAN Administrator becomes the link between the school and the Khanya project. Additionally, the LAN Administrator is expected to assist other educators at the school when they are using the Khanya lab.
Support and training interventions provided by the Khanya project are not always successful. For instance, in 2007 the programme manager for the Khanya project, Kobus Van Wyk stated in the article “Gadget Graveyards. Khanya Education through Technology” that technical problems and the low confidence levels of educators when using technology in teaching are the reasons why some Khanya schools are facing challenges in using the technology optimally. The technical problems arise due to limited technical resources available to the Khanya project. Again, even though the educators have received the necessary training, some educators still show an inability to make the shift to using the computers as a teaching tool (Van Wyk, 2007). In order to reap the maximum benefit from the Khanya project, it becomes important to understand the factors that influence the success rates of ICT initiatives in the schools in the province. In order to determine these factors additional research is, therefore, needed in the area of implementation and use of ICT initiatives within schools.

2.3.6. Software which Khanya provides to schools
Equipping South Africans with relevant ICT skills would improve the chances of the South Africans in sharing in the development opportunities enabled by the information revolution (Beute, 2003). Table 2.1 summarises the educational software packages provided by Khanya and used by the respondents in teaching.

Table 2.1: Summary of the educational software packages used by the respondents

<table>
<thead>
<tr>
<th>Educational Software</th>
<th>Use of Software</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cami Maths</td>
<td>Mathematics</td>
</tr>
<tr>
<td>Cami English</td>
<td>English</td>
</tr>
<tr>
<td>Master Maths</td>
<td>Mathematics</td>
</tr>
<tr>
<td>Mindset</td>
<td>Mathematics and other subjects where available</td>
</tr>
<tr>
<td>Learn Channel</td>
<td>Business Studies and others subjects where available</td>
</tr>
<tr>
<td>Encarta</td>
<td>Technology related subjects</td>
</tr>
<tr>
<td>Excel</td>
<td>Mathematics (Graphs and Data Handling)</td>
</tr>
</tbody>
</table>

The schools had internet access as well in order to access additional educational material to be used in teaching.
2.4 The use of ICT within education

The value of incorporating ICT into the curricula has been acknowledged in current discussions held in educational circles. The value added by ICT to the teaching environment, however, is not automatic and, in order to benefit from the use of ICT within schools, detailed planning is needed. Extensive support to learners and teachers is essential in order to improve the success rate (Louw, Muller & Tredoux, 2008). This section discusses the findings of studies conducted into identifying the factors that influence the use of ICTs in education. The discussion continues onto the section on the Brazilian eLearning Teacher Training in K-12 project that is similar to the Khanya project, also highlighting the major benefits of using ICTs in education.

2.4.1. Factors that influence the use of ICTs in education

Concerns about the factors that threaten the successful introduction of ICTs into the educational system have been discussed in the literature and include the importance of teachers getting the necessary ICT training to use the computers successfully. The training should also extend to include: the use of content-specific software (BECTA, 2001; Howell & Lundall, 2000), the importance of choosing appropriate educational software that is appropriate for the learning tasks (Chang, Chen & Sung, 2001), adequate access to computers for both the learners and the teachers are essential (Wenglinsky, 1998) and that schools need sufficient financial support to ensure the continued success of the ICT intervention into schools (Howell & Lundall, 2000).

Louw et al. (2008) conducted research on the Khanya project in 2003 to determine the effectiveness of introducing computers into the Mathematics curriculum. The study was looking at Grades eleven and twelve in disadvantaged schools. The necessary training and support was provided to educators and learners over the time of the study. The study showed a positive relationship between the final Mathematics results and the ICT intervention.

Louw et al. (2008), however, expressed caution when interpreting the results. Where the ICT intervention took place, the results stayed constant, but in the control group the results declined. The researchers also highlighted the fact that the learners were spending little time using the Master Maths software. From log files obtained for the period April 2003 to September 2003, the average time spent by learners using the Master Maths software was approximately three hours. The study showed that at that time the Khanya project was still going through a “settling down” process and was busy working out the issues around successfully delivering the new teaching curriculum.

Miller, Naidoo and Van Belle (2006) conducted research into identifying the critical success factors related to the intervention of ICTs into the Western Cape Schools. The study highlights three important themes, namely: a positive attitude expressed by the teachers to using ICTs in their teaching is critical, teachers must be equipped with the relevant ICT skills and that there is a clear indication
around the expected use of ICT in schools. This can be achieved through changing the school’s culture to clearly incorporate the use of ICTs, by setting clear goals around the expectations of using the ICTs within the school and providing adequate support and resources to enable the use of ICTs in teaching.

One of the gaps identified by Miller et al. (2006) is that educators are unaware of the teaching resource aids available to them in order to obtain the necessary ICT skills needed to successfully incorporate ICT into their teaching. The study concentrated on schools in the urban areas. There is a need to extend this research to include schools in rural areas where ICT interventions are also taking place. In order for ICTs to become a teaching enabler, enhancing the performance of the learners and improving the professionalism of teachers, it becomes essential to determine and address the factors that influence the successful implementation of ICT school initiatives (Jurich, 1999; Dwyer, 1994).

2.4.2. Brazilian eLearning Teacher Training in K-12

A similar project to the Khanya project is the Brazilian eLearning Teacher Training in K-12 (BET K-12) project currently running in Salvador de Bahia, Brazil. The purpose of the BET K-12 project is to introduce and assess the use of ICTs as well as to provide training to primary school teachers on the ICTs. The BET K-12 project operates in disadvantaged schools in the area of Salvador. In Brazil, government legislation requires teachers to have a university degree in order to teach. The BETK-12 project included 44 teachers who were enrolled at university. These teachers were trained in using ICTs and in introducing ICT into their teaching activities. An added benefit of the ICT teacher training programme is equipping teachers to live and work in the knowledge society (Cantoni, Fanni, Rega & Tardini, 2009). An extension to this is that academic and training institutions have started to test the use of ICTs in delivering the teaching training curricula (Amaral, Lobato & Marinho, 2004; Modro, 2002; Bof, 2004).

The research goals of the BET K-12 project are identified as follows (Cantoni et al., 2009):

- **Access to ICTs:** It investigates the technical, economic, sociological and psychological factors surrounding the access to ICTs, and how these factors influence the individual’s opportunities to get access to and use the technologies;

- **Quality:** This refers to investigating and determining the relevant conditions needed to effectively and efficiently implement an eLearning programme for primary school teachers teaching in Brazil;

- **Impact:** This is to determine the state of readiness needed by the primary school teachers to successfully use the ICT skills learnt on the eLearning training programme within their teaching.
The major advantage of ICT training programmes such as the BET K-12 project is that the programme goes beyond convincing individuals about the potential benefits that will be derived from using the new technology (selling the technology) and also focuses on coaching, teaching and encouraging the individuals. This will ensure that the individuals have the relevant skills and confidence in their ability to use the technology (Compeau, Higgins & Huff, 1999).

2.5. Teacher motivation and job satisfaction

According to the existing literature, the levels of morale, motivation and job satisfaction experienced by teachers is a product of a wide range of factors. The impact is either positive or negative. To have educators who are motivated with high levels of morale, it becomes essential to identify the factors that impact on teacher satisfaction. Satisfied teachers are less likely to leave the teaching profession as compared to those teachers who express a low degree of job satisfaction (Alt, Chen, Choy, Geis, Henke & MPR Associates, 1997). The value of gaining an insight into the factors that negatively impact on an educator is the resulting action of finding ways to address these negative factors (Badenhorst et al., 2008). The aim of this study is to investigate the factors that impact on educators involved in ICT school initiatives within a school environment. The discussion below informs us of the dimensions that teachers find satisfactory or unsatisfactory. This section discusses the findings of studies conducted into identifying the factors that influence teacher motivation and job satisfaction, and how the lack of job satisfaction impacts on educators and their schools.

2.5.1. The factors that influence teacher motivation and job satisfaction

There is a close relationship between the climate within a school and the teachers’ level of job satisfaction. Opportunities within the school that allow for teacher advancement and for teachers to further their studies will help to promote a positive school climate which will have a positive influence on the level of teachers’ job satisfaction. On the other hand a school climate in which educators have difficulties with the material conditions in the school, with their wages and with the school leadership, will result in a negative influence on the level of teachers’ job satisfaction. The teachers’ morale, satisfaction with their job and appreciation of administration can be further stimulated by having a good school administrative, teaching and study climate (Qiwen & Xiaofu, 2006/2007). Teachers also show high levels of job satisfaction when working in a school environment that has an open climate (Natarajan, 2001).

Morale may also increase when teachers are satisfied with their remuneration and their relationships with their colleagues (Dordero, 1997). Bolin (1996/2007), however, adds that an increase in the remuneration of teachers on its own will not be enough to address the problems of low morale experienced by teachers. Self-fulfilment needs such as achievement, recognition, the possibility of growth and advancement, added responsibility and the nature of work itself, play an important role in the lives of a teacher. Support from the school administration is also important. Teachers show a lack
in motivation when they do not get support from administration (Ashton & Webb, 1986; Ostroff, 1992).

Demographic factors such as age and length of service affects the levels of motivation, morale and job satisfaction of teachers. Bolin (1996/2007) and Zhizhong (2000) highlight that, as the teacher increases in age, there is a corresponding increase in the aspects leading to teacher job satisfaction. Bolin (1996/2007) showed that as the teacher ages, there is a subsequent increase in the levels of satisfaction shown in factors such as self-fulfilment, income and relationships with colleagues. These same teachers also are less satisfied with the workload. Jirong and Jipong (2004), however, highlight that the relationship between age and job satisfaction forms a U-shaped pattern. Younger teachers place greater importance on factors such as job interest, creativity and challenges in their job (Fandi & Liguo, 2004).

The National Professional Teachers’ Organisation of South Africa (NAPTOSA) issued a report that highlights findings on teacher morale (Hayward, 2002). The report stated that:

- one in every four educators has a sense of low morale toward the profession
- 33.7% of educators feel indifferent towards the teaching profession
- a further 38.2% of educators have negative feelings toward the teaching profession

Table 2.2 lists the factors highlighted by the educators that have a negative impact on teacher morale.

**Table 2.2: Educator morale in South Africa in 2002: Report on findings (Hayward, 2002)**

<table>
<thead>
<tr>
<th>Factors Identified</th>
<th>Percentage Highlighted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor leadership style of the provincial departments</td>
<td>65.5%</td>
</tr>
<tr>
<td>Lack of support received from department officers</td>
<td>63.2%</td>
</tr>
<tr>
<td>Continuous change in educational methodology and policy</td>
<td>60.0%</td>
</tr>
<tr>
<td>Poor Salary Package</td>
<td>58.1%</td>
</tr>
<tr>
<td>Poor quality of communication between educational stakeholders</td>
<td>53.4%</td>
</tr>
<tr>
<td>Limited promotional prospects</td>
<td>50.8%</td>
</tr>
<tr>
<td>Increase in paperwork – workload</td>
<td>49.3%</td>
</tr>
<tr>
<td>Lack of educational resources</td>
<td>43.7%</td>
</tr>
<tr>
<td>Limited authority to take your own initiative</td>
<td>41.1%</td>
</tr>
<tr>
<td>Low educator-learner ratio</td>
<td>37.4%</td>
</tr>
<tr>
<td>Low morale in learners</td>
<td>37.4%</td>
</tr>
</tbody>
</table>
Badenhorst et al. (2008) looked at the factors affecting teacher morale, motivation and job satisfaction in terms of their intrinsic and extrinsic properties. The sample for the study consisted of 337 secondary-school teachers randomly selected from 17 government schools in the Windhoek region of Namibia. The study revealed that the teachers showed high levels of job dissatisfaction in the intrinsic aspects of their job. Particular attention was focused on factors relating to the school area and rank. The study also highlighted a significant correlation between the levels of burnout expressed by teachers and the low levels of teacher satisfaction. Although the study is important in identifying areas of concern in the education system that need to be addressed in order to improve levels of morale, motivation and teacher satisfaction, the study is quantitative in nature and hence did not capture the richness and complexity of teachers' perceptions of their workplace. To address this limitation, a qualitative approach to the data collection would be more beneficial.

Chong, Hannok, Huan, Kates, Klassen and Wong (2008) used the concept of self-efficacy to investigate the motivational beliefs of secondary school teachers in Canada and Singapore. Like Ashton and Webb (1986) and Ostroff (1992), Chong et al. (2008) show the importance of administrative support in teacher motivation. Chong et al. (2008) go further to show that student factors and the school climate are additional factors that influence the motivation and job satisfaction of teachers. The motivational beliefs of a teacher shows a positive growth when the teacher receives encouragement and support from the school administration and their colleagues. The collective motivation of the teachers within a school is also built by administrative support. Feedback from students also enhances the motivation of teachers.

The impact of teaching challenging students on the school climate affects teachers negatively. These students have severe academic and behavioural problems that need a significant investment from the teacher to improve the academic performance of these students. The academic and behavioural problems expressed by the students are further exacerbated by the use of drugs. A possible solution is to identify high risk students and place them into programmes designed to help them with their social problems, as well as to provide intensive review of school lessons. The administration of the school needs to take the lead in addressing this social problem (Chong et al., 2008).

Like Qiwen and Xiaofu (2006/2007) and Natarajan (2001), Chong et al. (2008) showed that the climate in the school has an impact on the motivation of the teachers within the school. Chong et al. (2008) extended the motivational impacts of a positive school climate to include students as well. A positive, caring, nurturing school environment has a positive impact on the motivational levels of the teachers. Here the principal and the administrative staff of the school are seen to play an essential role in supporting the teachers as well as creating an academic environment in the school that nurtures and cares for the students.
2.5.2. Lack of job satisfaction and its impact on educators and the school environments

Several research studies have highlighted the facts that the effectiveness of an educational system is largely dependent on the educators employed in the system as well as the levels of job satisfaction experienced by these educators. Lack of job satisfaction experienced by the educators tends to impact on the educational system negatively (Badenhorst et al., 2008; Borg & Riding, 1991; Borgen & Decker, 1993; Carr, 1994; Kotterman, 2000; Mwamwenda, 1995; Neumann, Reichel & Saad, 1988; Steyn, 1992).

According to Mwamwenda (1995) and Steyn (1992), the lack of job satisfaction experienced by educators tends to lead to high rates of absenteeism from school. The attitudes and behaviour of these educators are also affected. The change in behaviour that is displayed can be aggressive and directed toward their colleagues and learners. Changes in their physical well-being as well as psychological withdrawal from their work have also been noted. The lack of job satisfaction also brings about the early exodus of educators from the teaching profession. Mwamwenda (1995) highlights that this early exodus from the teaching profession, as well as the high rates of absenteeism have cost implications both to the educational system as well as the society as a whole.

The impact on the physical well-being of educators is further discussed by Badenhorst et al. (2008), Borg and Riding (1991), Borgen and Decker (1993) and Carr (1994). In their research they highlight a correlation between educator burnout and job satisfaction. Neumann et al. (1988) state that there are cases where an educator continues to stay in the teaching profession, even though that educator expresses distress at being an educator and wish to leave the teaching profession. In these cases the educator is usually happy with certain aspects of his/her work and unhappy with others, but is not willing to give up just yet. This is an unhealthy situation since the continual cycle of distress will exacerbate the tendency toward burnout and job dissatisfaction. Kotterman (2000) mentions that one of the key actions needed to address the exodus of educators from the teaching profession is to provide a support mechanism to educators.

2.6. Summary

Educators play a central role in implementing new initiatives within schools and therefore also make a significant contribution to the success or failure of these initiatives. The Khanya project is one of those school initiatives where educators are instrumental in the success of the project within the school. Over the years the WCED has made a substantial financial investment in the Khanya project and therefore the success of the Khanya project is critical. It therefore becomes essential to identify those factors that affect teacher motivation and job satisfaction and how these factors impact on the success of the Khanya project.
3. Theoretical Frameworks

3.1. Introduction

The focus of the study is to look at the factors which may affect the motivation levels of educators vis-a-vis the use of ICT for curriculum delivery. The literature shows that several approaches can be used to investigate concepts such as motivation, morale and job satisfaction. These differing approaches use various research theories such as Hoppock’s (1935) publication on job satisfaction, Maslow’s (1943) Hierarchy of Needs Theory, Herzberg’s (1959) Motivation-Hygiene Theory, Social Cognitive Theory by Bandura (1986), Theory of Planned Behaviour by Ajzen (1991) and Teacher Self-efficacy model by Hoy, Woolfolk-Hoy and Tschannen-Moran (1998). These competing theories will be discussed in more detail in the sections to follow. Section 3.8 goes on to discuss why Herzberg’s Motivation-Hygiene theory is still relevant today and is also appropriate for ICT-related studies.

3.2. Hoppock’s seminal publication on job satisfaction

Hoppock’s (1935) publication on job satisfaction marked the beginning of studies on job satisfaction. Hoppock’s (1935) approach to measuring the levels of job satisfaction is to use general unspecific questions. The reason for using general unspecific questions is that Hoppock (1935) believed that each individual has his/her own way to determine which job facets to consider as important and how to weigh each facet. The survey consists of four questions, namely:

1. Choose the ONE of the following statements which best tells how well you like your job.
2. Check one of the following to show HOW MUCH OF THE TIME you feel satisfied with your job. (3) Check the ONE of the following which best tells how you feel about changing your job, and (4) Check one of the following to show how you think you compare with other people (Hersen, 2004, p. 479; Hoppock, 1935).

The individuals are asked to select an answer off a seven point Likert scale, where one indicates most dissatisfaction and seven indicates most satisfaction. The strength of Hoppock’s (1935) survey is that it is short, easy to understand and administer (Hersen, 2004).

3.3. Herzberg’s Motivation-Hygiene Theory

3.3.1. Development of Herzberg’s Motivation-Hygiene Theory

The Two Factor Theory, also known as Herzberg’s Motivation-Hygiene Theory, was developed by Frederick Herzberg in 1959. Herzberg, Mausner and Snyderman (1959, 1967) propose that job satisfaction and job dissatisfaction operate independently from each other. From the studies conducted by Herzberg et al. (1959, 1967) into job satisfaction of workers, it was highlighted that there are factors present within the job itself and within the environment in which the job is conducted that
leads to satisfaction or lack of satisfaction. The one set of factors led to job satisfaction and the other to job dissatisfaction. The factors that are associated with the job itself are also referred to as intrinsic factors or motivational factors while those factors associated with the job environment are referred to as extrinsic factors or hygiene factors.

Motivational or growth factors are those factors that encourage workers to improve their performance within a particular job. Motivational factors work to increase job satisfaction. Similarly, a worker will not perform optimally within his/her job as long as the hygiene factors are not satisfied. Hygiene or maintenance factors work to decrease job dissatisfaction. Herzberg et al. (1959, 1967) identified the motivational factors as being achievement; recognition; work itself; responsibility; possibility of growth and opportunity for advancement. The hygiene factors are company policy and administration; supervision; salary; interpersonal relationships (with supervisor, peers, subordinates); factors affecting personal life; status; job security and working conditions. Table 3.1 provides a summary of the motivational and hygiene factors.

<table>
<thead>
<tr>
<th>Motivational Factors</th>
<th>Hygiene Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achievement</td>
<td>Company Policy and Administration</td>
</tr>
<tr>
<td>Recognition</td>
<td>Supervision</td>
</tr>
<tr>
<td>Work Itself</td>
<td>Salary</td>
</tr>
<tr>
<td>Responsibility</td>
<td>Interpersonal Relationships (with supervisor, peers, subordinates)</td>
</tr>
<tr>
<td>Possibility of Growth</td>
<td>Status</td>
</tr>
<tr>
<td>Opportunity for Advancement</td>
<td>Job Security</td>
</tr>
<tr>
<td></td>
<td>Working Conditions</td>
</tr>
<tr>
<td></td>
<td>Factors affecting Personal Life</td>
</tr>
</tbody>
</table>

Satisfaction and dissatisfaction are not found at opposite ends of a continuum and the opposite of satisfaction is not dissatisfaction but “no satisfaction”. Similarly the opposite of dissatisfaction is not satisfaction but “no dissatisfaction” (Herzberg et al., 1959, 1967). The following example explains this concept: the operation of an air conditioner within a company can be seen as a working condition that has an impact on the environment in which the job is carried out. An air conditioner that stops working on a hot day will increase the levels of dissatisfaction experienced by the workers. However, if the air conditioner works as expected through the working day, the workers will not experience an opposite increase in the levels of satisfaction, but will move into the area of no dissatisfaction (Myers & Tietjen, 1998). Figure 3.1 is a schematic representation of the interaction between motivation and hygiene factors within the job environment.
According to Herzberg (1966), contentment within the work situation is not achieved by satisfying an individual's lower order needs such as having safe and pleasant working conditions, but rather by satisfying an individual's higher order needs such as achievement, recognition and authority. Overall job satisfaction is achievable when one is working towards satisfying both the motivational and hygiene factors. Overall job satisfaction refers to the "workers' attitude toward the entire set of factors, including both the work itself and the work environment – in other words, the workers' reaction to all of work" (Hongying, 2005/2007, p. 13).

![Herzberg's Motivation-Hygiene Theory](image)

**Figure 3.1: Herzberg’s Motivation-Hygiene Theory (Examstutor, 2008)**

3.3.2. Criticisms levelled against Herzberg’s Motivation-Hygiene Theory

Over the years there have been several criticisms levelled against Herzberg’s Motivation-Hygiene Theory. These criticisms include the claim that the Two-Factor Theory is not really a theory of motivation but rather a theory of satisfaction (Hanson, 1996). This section outlines some of the criticisms levelled against Herzberg’s Motivation-Hygiene Theory.

House and Wigdor (1967) identified four criticisms during their review of the Herzberg’s Motivation-Hygiene Theory:

- the lack of having an overall measure for satisfaction
- possible researcher contamination due to the evaluation of respondent’s behaviours
- Herzberg’s Motivation-Hygiene Theory being bound methodologically to incidents where factors of satisfaction and dissatisfaction are determined
- the gap in the Herzberg’s Motivation-Hygiene Theory when defining the relationship between satisfaction and productivity is that the situational variables have not been taken care of
According to Hackman and Oldham (1976), the Herzberg’s Two Factor Theory does not allow for individual differences. The individual differences can be a result of particular personality differences. The differences would result in unique individual responses to motivational and hygiene factors. Lawler and Nadler (1979) contend that erroneous assumptions such as assuming that all employees and situations are alike have been made by Herzberg’s Motivation-Hygiene Theory.

Locke (1970) argues that there is a difference between human needs and human values. Values are more associated with goals. The two characteristics shared by values and goals are those of having content and intensity. Content answers the question as to what the employee values and intensity answers how much the employee values. In terms of job satisfaction, an employee performs adequately when pursuing his/her goals.

Locke (1976) goes further to say that the level of job satisfaction can be determined by looking at the gap between actual performance and perceived performance. Perceived performance is also an indication of the values set by the individual. If the gap between actual performance and perceived performance is close together, the employee will feel a greater achievement of his values and therefore a higher level of satisfaction.

3.3.3 Commenting on the criticisms
Herzberg et al. (1959) formulated the Two-Factor Theory on the divisive premise that remuneration fails to motivate employees beyond a minimum threshold. At that time, Herzberg et al. (1959) received much criticism for this statement. In response to the critics, Herzberg (1968/1987) published “One more time: How do you motivate employees”. Herzberg (1968/1987) draws a critical distinction between motivation and movement. This distinction is often confused by managers. Movement stems from the need to satisfy basic biological needs which include a human’s need to avoid pain from the environment. An example from the workplace is when an employee is offered an incentive in order to deliver a required piece of work. Management sees the required delivery of the piece of work as an indication that the employee is motivated. Herzberg (1968/1987) states that it is actually management who is motivated to promote employee movement. Employees are only truly motivated when the desire to move comes from within the employee and is not externally generated by incentives. Once this distinction is understood, an organisation can move toward true job enrichment as appose to job enlargement (Herzberg, 1968/1987; Bassett-Jones & Lloyd, 2005).

3.4. Maslow’s Hierarchy of Needs Theory

3.4.1. Development of Maslow’s Hierarchy of Needs Theory
Maslow (1943) published “A Theory of Human Motivation”. In this theory Maslow explains that human beings have needs and these needs need to be satisfied. Maslow (1943) then indicated that these needs can be arranged into a sequence reflecting importance, with the most basic needs situated
at the bottom and moving upwards to higher level needs. This arrangement creates a hierarchy of needs. Figure 3.2 is a schematic representation of the hierarchy of needs and Table 3.2 outlines the five levels of human needs and what leads to the satisfaction of each level.

![Hierarchy of Needs Diagram](image)

**Figure 3.2: Maslow's (1943) Hierarchy of Needs Theory (Examstutor, 2008)**

**Table 3.2: Abraham Maslow. Motivation and Personality (Maslow, 1954)**

<table>
<thead>
<tr>
<th>Hierarchy Of Needs</th>
<th>Explaining the steps of satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Physiological needs</td>
<td>The basic human needs to sustain one's life which includes the need for food, water and shelter.</td>
</tr>
<tr>
<td>2. Safety or Security needs</td>
<td>Human needs that make one feel safe and secure, which includes one's own safety as well as job, property and food security.</td>
</tr>
<tr>
<td>3. Social needs</td>
<td>The need to feel loved and accepted within a society drives this human need.</td>
</tr>
<tr>
<td>4. Self-Esteem needs</td>
<td>The human need to gain respect and admiration. The satisfaction of this need builds self-respect, self-confidence and a sense of achievement.</td>
</tr>
<tr>
<td>5. Self-Actualisation</td>
<td>The human need is to achieve self-fulfilment and reach one's potential.</td>
</tr>
</tbody>
</table>

**3.4.2. Criticisms levelled against Maslow's Hierarchy of Needs Theory (1943)**

The main criticism of Maslow's Hierarchy of Needs is the lack of empirical evidence to support the assumptions made by Maslow. Maslow assumes that human beings will strictly move through the hierarchy of needs, satisfying one need before progressing onto the next need in sequence. On the contrary, there are a number of examples of people who can be described as lacking the basic needs yet who have achieved needs which can be categorised as belonging to the higher categories.
instance, even though Van Gogh and Galileo suffered from mental illness, they were still able to produce exceptional work that greatly impacted on the world around them. Furthermore, Trachtenburg and Frankl delivered influential work in Arithmetic and Psychology while suffering in concentration camps (Boree, 1998; Drenth, Theirry, Willems & de Wolff, 1984).

3.4.3. Commenting on the Criticisms
Maslow explained that certain individuals place more emphasis on higher order needs than on lower order needs and will therefore shift the needs around within the hierarchy. This can happen when a need has been neglected for a long time and then loses much of its value to the individual. This could explain why certain individuals show a strong drive to satisfy a creative need at the self-actualisation level resulting from a lack experienced in the other needs (Leavitt & Pondy, 1964).

3.4.4. Comparing Maslow’s Hierarchy of Needs with Herzberg’s Motivation-Hygiene Theory
There are similarities between Herzberg’s Motivation-Hygiene Theory and Maslow’s Hierarchy of Needs Theory. If the two theories are compared side by side, the lower level needs in Maslow’s Hierarchy of Needs Theory seem to pair up with the hygiene factors of Herzberg’s Motivation-Hygiene Theory. Similarly the higher level needs in Maslow’s Hierarchy of Needs Theory seem to tie up with the motivation factors in Herzberg’s Motivation-Hygiene Theory (Examstutor, 2008). This apparent correlation between the two theories seems to validate the initial hypothesis underpinning both theories. Figure 3.3 is a schematic representation of the parallels that can be drawn between Maslow’s Hierarchy of Needs Theory and Herzberg’s Motivation-Hygiene Theory.

![Figure 3.3 : Comparing Maslow & Herzberg (Examstutor, 2008)](image)

3.5. Social Cognitive Theory and Self-efficacy
3.5.1. Development of Social Cognitive Theory
The Social Cognitive Theory was developed by Bandura (1986) to explain individual behaviour. According to Bandura (1986) cognitive, vicarious, self-regulatory and self-reflective processes play a central role in human adaptation and change. People are more than reactive organisms responding to
environmental forces and their inner pulses, but should be viewed as self-organising, proactive, self-reflecting and self-regulating organisms. The dynamic interaction between the personal factors (cognition, affect and biological events), behavioural factors and environmental factors is a product of human functioning. The dynamic interplay forms the basis of the concept known as Reciprocal Determinism, also called Triadic Reciprocity. The reciprocal nature between behavioural, personal and environmental factors means that the individual interpreting the results of his/her behaviour will have an informing and altering action on the individual’s environment and personal factors. The next action in turn will inform and alter the subsequent behaviour of the individual (Pajares, 2002). Figure 3.4 is a schematic representation of the Triadic Reciprocity.

![Triadic Reciprocity](image)

Figure 3.4: Triadic Reciprocity or Reciprocal Determination (Bandura, 1986)

An educator wanting to improve the confidence and academic performance of his/her learners could use the Social Cognitive Theory as a framework. The theory could be applied as in the following steps:

1. The educator can improve the emotional state and levels of self-belief in the learners (personal factors).
2. The educator can focus on improving the academic skills and self-discipline practices of the learners.
3. The educator can focus on improving environmental factors such as changing ineffective school and classroom structures.

All the factors work together to improve the overall functioning of the human being (Bandura, 1986; Pajares, 2002).

3.5.2. Social Cognitive Theory and its relationship with Self-efficacy

Bandura (1986) believed that self-efficacy is not a theory on its own, but part of the Social Cognitive Theory. Self-efficacy is an important construct in social psychology and is defined as:
"People’s judgements of their capabilities to organize and execute courses of action required to attain designated types of performances. It is concerned not with the skills one has but with judgements of what one can do with whatever skills one possesses" Bandura (1986, p. 391).

The perceptions an individual has of his/her level of self-efficacy has an influencing effect on the decisions an individual makes relating to what behaviours to perform (Adams, Bandura, & Beyer, 1977; Betz & Hackett, 1981). Barling and Beattie (1983), as well as Brown and Inouye (1978), focused on how the level of self-efficacy expressed by an individual, impacts on the effort exerted as well as the persistence shown by the individual in attempting the behaviours. The emotional responses of an individual to performing behaviours are also an important area of focus. Experiencing fear, anxiety and/or stress can impact on the behavioural responses of an individual (Bandura, 1977; Brief, Hartman & Stumpf, 1987).

The coping mechanisms of a teacher giving a lecture using ICT as a tool to deliver the teaching curriculum is important. If the individual feels that he/she does not have the capabilities to cope with a particular situation, the individual will avoid the situation and find other situations in which they feel more comfortable and able to handle. This could lead to teachers resisting the use of ICTs within the classroom and moving back to more trusted methods such as using the chalkboard and chalk as teaching tools.

Persistence is also important in determining the individual's efficacy expectation levels. An individual who has a high level of persistence will persist longer when tasks and situations become more difficult, so is more likely to succeed at executing the behaviour. This success would lead to further increases in the individual's efficacy expectations (Bandura, 1998). When persistence levels are low, the individual is more likely to minimise difficult behaviours which further reinforces his sense of low self-efficacy (Strauser, 1995; Jenkins, Hamsley, Strauser & Waldrop; 1998; Jenkins, Strauser & Waldrop, 1998).

Self-efficacy is also situation-specific i.e. the level of self-efficacy expectations experienced by an individual will range from high to low depending on the specific task that needs to be performed, the specific situation or the particular behaviour expected by the individual (Robertson & Sadri, 1993).

3.5.3. Factors affecting Self-efficacy
The four factors that impact on self-efficacy are: Experience, Modelling (Vicarious Experience), Social Persuasion and Psychological Factors (Bandura, 1986; 1997). The impact of these four factors will be discussed in the following sub-sections.
3.5.3.1. Experience and its impact on Self-efficacy

Becoming a master at performing tasks influences a person's self-efficacy. Self-efficacy beliefs increase if there is a positive perception in terms of performance. This positive belief in oneself extends into the future. A perception of failure will impact on the performance of the individual and will also reduce the possibility of future successes. Attributions also play an important role in influencing the confidence levels of the teacher. If an educator attributes the successful outcome of a task to internal or controllable causes which the educator could interpret as his/her teaching ability or effort, then the self-efficacy of the educator would be enhanced. However, the self-efficacy of the educator would not be enhanced when he/she sees the success as being external to him/herself (e.g. it is the result of being fortunate or due to the intervention of someone else) (Bandura, 1993; Pintrich & Schunk, 1996).

3.5.3.2. Modelling and its impact on Self-efficacy

Modelling occurs when an individual compares him/herself with another person. Individuals usually model themselves on someone else. This is particularly true when the person doing the modelling sees the person he/she is modelling as similar to himself or herself. If the individual sees that the person being modelled is successful, then the self-efficacy of the person doing the modelling would increase. The converse is also true, i.e. an individual's self-efficacy would be negatively affected if he/she sees that the person being modelled has failed a task. Effective training which will assist with the modelling process has been identified as being important (BECTA, 2001; Howell & Lundall, 2000; Khanya, 2008a).

3.5.3.3. Social Persuasion and its impact on Self-efficacy

Social persuasion refers to being encouraged or discouraged by someone from outside. These influences can be quite strong. It is possible to think back to a situation in the past where outside influence altered the confidence levels either positively or negatively. Negative input can reduce one's belief in one's self-efficacy while positive input can increase one's belief in one's self-efficacy. Miller et al. (2006) highlighted that there should be a clear indication in the school culture around the expectations of using ICTs in teaching.

3.5.3.4. Physiological Factors and its impact of Self-efficacy

Physical symptoms of distress such as shaking, fatigue, pain and fear can be experienced during stressful times. The interpretation of these physical symptoms can influence the person's perceived level of self-efficacy. If the physical symptoms are seen by the individual as his/her own inability to manage the situation, it could lead to a lowering of the individual's self-efficacy. In contrast, a person who has a high self-efficacy will not see these physical symptoms as an indication of his/her ability, but rather as a normal physiological response to the situation. The individual can overcome the negative impact of physiological factors by having effective coping mechanisms.
3.5.4. Criticisms levelled against Social Cognitive Theory (1986)

A significant criticism of the Social Cognitive Theory is that the theory is not unified. Extensive research has gone into concepts and processes such as observational learning and self-efficacy, but explanations of the relationships amongst the concepts and processes are limited. An additional challenge to Bandura's (1986) theory is that human behaviour is more consistent than is expressed by Bandura in his research where the focus is predominantly on the situation. The Social Cognitive Theory also has a limited focus on biological or hormonal processes (Monash University, 2001).

3.6. Teacher Self-efficacy model

3.6.1. Beginnings of Teacher self-efficacy

Teacher self-efficacy is defined as a teacher's "judgement of his or her capabilities to bring about desired outcomes of student engagement and learning, even among those students who may be difficult or unmotivated" (Hoy & Tschanne-Moran, 2001, p. 783). Bandura (1977) and Rotter (1966), historically played an influencing role in Teacher self-efficacy. One of the more powerful forces in learning, teaching and motivation is self-efficacy (Bandura, 1977). The concept of Teacher self-efficacy was first studied in 1976 by the Rand Corporation (Amor, Conroy-Oseguera, Cox, King, McDonnell, Pascal, Pauly & Zellman, 1976). Many significant educational outcomes such as showing the persistence needed to continue the hard work in order to get through teaching tasks that are difficult, being enthusiastic and showing commitment to your students as well as the teaching profession, have been researched. Ultimately, the outcome of teaching is to develop students who are motivated, are achievement focused and have a strong belief in their own self-efficacy (Hoy & Tschanne-Moran, 2001).

Since the Rand Corporation study, the beliefs an educator has in his/her level of self-efficacy has been associated with:

- student outcomes such as achievement (Ashton & Webb, 1986; Esselman & Moore, 1992 & Ross, 1992)
- levels of student motivation (Eccles, Feldlaufer & Midgley, 1989)
- the student’s own belief in self-efficacy levels (Anderson, Greene & Loewen, 1988)

Educators with higher levels of efficacy tend to display greater organisational and planning capabilities (Allinder, 1994), are more open to new ideas and are more likely to experiment within their teaching in order to better meet the needs of their students (Guskey, 1988; Stein & Wang, 1988).

3.6.2. Development of the Teacher self-efficacy model

According to Hoy, Hoy and Tschanne-Moran's (1998) model of teacher efficacy, the mastery experience, physiological arousal, vicarious experience and verbal persuasion identified by Bandura
(1986, 1997) are the four sources of efficacy information that influence the efficacy beliefs held by teachers. Figure 3.5 is a schematic representation of the multidimensional model of teacher efficacy.

![Multidimensional model of teacher efficacy](image)

**Figure 3.5: Multidimensional model of teacher efficacy.** From "Teacher Efficacy: Its Meaning and Measure," (Hoy et al., 1998).

During the cognitive processing stage the educator interprets the efficacy information received from the mastery experiences, physiological arousal, vicarious experiences and verbal persuasion sources. The interpretation of the efficacy information plays a critical role in the creation of efficacy beliefs. This interpretation also influences the next stages of the model, namely: analysis of the teaching task and the assessment of personal teaching competence (Hoy et al., 1998).

During the analysis of the teaching task, the educator needs to anticipate what is required in order to successfully perform the teaching task in a particular situation. This analysis will include identifying factors that makes teaching difficult and resources available that facilitate the learning process. From this anticipation the educator will be able to infer the difficulty of the teaching task. For novice educators entering the teaching profession, the analysis process is usually a shock to their reality. The real complexity of the teaching task sets in and overly ambitious enthusiasm is reduced to realistic teaching outcomes (Hoy et al., 1998; Weinstein, 1988).

During the assessment of personal teaching competence, the educator assesses whether his/her traits are adequate for the teaching task in question. The educator evaluates his/her personal capabilities in areas such as teaching skills, current knowledge, teaching strategies and personality traits. From the
evaluation, the educator will determine whether he/she is capable of successfully performing the teaching task at hand. Bandura (1993) states that a person (an educator in the Hoy et al. (1998) model) who believes that his/her abilities and strategies are fixed and will not be improved by additional training or by gaining additional experience, will have a low efficacy belief in him/herself. On the other hand, educators who know their weaknesses and believe that these areas can be improved through training and gaining experience, have a strong sense of teacher efficacy (Hoy et al., 1998).

An important characteristic of the Hoy et al. (1998) model is its cyclical nature. An educator who performs a teaching task successfully experiences a greater sense of efficacy, which will encourage the educator to greater effort and to show more persistence when future situations becomes more complicated. The result is improved teacher performance and a greater teacher efficacy. A less successful educator will experience lower levels of efficacy which tend to lead to the educator giving less effort during teaching and also giving up easily. The result is poor teaching outcomes (Hoy et al., 1998). Beliefs held by the educator during the analysis phase of the teaching task, and when assessing the teaching competence, will remain unless proactive interventions take place to help these educators re-evaluate their beliefs (Bandura, 1997).

3.7. Theory of Planned Behaviour

3.7.1. Development of Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB) explains that the behaviour of an individual is driven by the behavioural intention of the individual and that the behavioural intention of an individual is influenced by three inputs namely:

- the individual’s attitude to the behaviour
- the subjective norm
- the individual’s perceived control over the behaviour

The individual’s attitude to the behaviour is based on the individual’s beliefs about the consequences resulting from the behaviour. The individual’s attitude will result in the individual having positive or negative feelings toward the desirability of performing the behaviour. The subjective norm is based on the perception held by the individual that performing this behaviour is seen as desirable by people important to the individual. Behavioural control is the perception held by the individual on how difficult it is to perform the behaviour (Ajzen, 1991; Chaiken & Eagly, 1993). Figure 3.6 is a schematic representation of TPB.
3.7.2. Criticisms levelled against Theory of Planned Behaviour (1991)

A common criticism levelled against TPB is that it fails to include variables such as self-identity, past behaviour, self-efficacy, moral judgement and affective response to behaviour (Armitage & Conner, 1998). TPB is further criticised about making the following faulty assumptions: that human beings think about the implications of their actions before deciding on whether to take part or not in a particular behaviour, and that human beings are rational and will use the available information in a logical way (Orr, n.d.).

3.8. Justification on selecting a theoretical framework

The aim of the study was to investigate factors in the workplace that impact on the levels of job satisfaction experienced by educators in their use of ICTs in curriculum delivery. These factors will either motivate or hinder the success of ICT initiatives in schools. A closer look at the theories discussed in this chapter shows that the best theory suited for this study to answer the question “What factors motivate people?” (Ogunlana & Ruthankoon, 2003) was Herzberg’s Motivation-Hygiene theory. The reason for deciding on Herzberg’s Motivation-Hygiene theory was that the theory is grounded in the investigation of worker job satisfaction, with the focus being on identifying those factors present within the job itself and within the environment in which the job is conducted that leads to satisfaction or lack of satisfaction (Herzberg et al., 1959, 1967). The added benefit was that the study is extending the use of Herzberg’s Motivation-Hygiene theory into a South African school context. The results from this research could further validate Herzberg’s Motivation-Hygiene theory (1959).

Even though Herzberg’s Two-Factor theory has received criticism in the past, the theory is still relevant today. Bassett-Jones and Lloyd (2005) conducted a study to determine whether the principles on which Herzberg’s Motivation-Hygiene theory (1959) is based on, are still relevant today, fifty years after the theory was proposed. The study focused on what motivates employees to contribute
ideas to improve working conditions. Over 3 200 responses were obtained and the outcome was that factors associated with the intrinsic satisfaction of the job are more important. Money and recognition are not the primary sources of motivation. This study shows that Herzberg’s Motivation-Hygien theory (1959) is still relevant today.

More importantly, Herzberg’s Motivation-Hygien theory has also been used in recent ICT-related studies; this further validates the use of the theory in the study. Studies conducted by Cartwright and Hammond (2003), Hendricks (1999) and Egan, Jefferies and Stockford (2007) are examples of ICT studies that used Herzberg’s Motivation-Hygien theory in the study. As part of a longitudinal study conducted over three years, Cartwright and Hammond (2003) interviewed nine educators who taught ICTs as a subject at secondary schools and colleges in the United Kingdom. Over the three years, the factors influencing job satisfaction remained intact. However, there was a shift in what educators stated as the factors influencing job dissatisfaction. In the first year the main source of job dissatisfaction was “students’ attitude to work and unruly behaviour of an individual or class”.

In the second year there was a shift in factors associated with job dissatisfaction to include “dealing with students’ coursework” and the “insensitive, fussy attitudes and lack of trust shown by people higher up in the hierarchy”. In the third year the shift continued to “focus mainly on management”. Educators who felt supported by the school management were “optimistic about their future within their schools”. Educators who felt unsupported by the school management were less optimistic about their future at the school. What was clear from the study was that the school management needs to actively support educators in order to keep them motivated and to prevent them from leaving the school.

Knowledge-sharing and improved access to information by knowledge workers could be enhanced by the use of ICTs, where ICT use reduces the physical barriers between these workers. Focusing on ICTs alone would have limited value, since the study would miss the human factor in the relationship. Hendricks (1999) focused on identifying those factors which would motivate knowledge workers to share knowledge. The study highlighted that the sense of achievement, the sense of responsibility and the recognition for a job well done are three important motivational factors that would encourage knowledge workers to share knowledge in order to benefit from knowledge application.

Part of the study conducted by Egan, Jefferies and Stockford (2007) was to determine the factors associated with the ICT classroom environment that could impact on the working conditions of educators. Some of the factors identified by educators that negatively impacted teaching are:

- Faulty and broken ICT equipment such as computers, printers and networks had a negative impact on teaching.
The design of the computer lab made it difficult for educators to sit with learners at the workstations in order to assist them.

During summer, the lack of ventilation and air-conditioning in some of the computer labs resulted in excessive heat in the labs that negatively impacted on educators and the concentration levels of learners. The excessive heat also caused the breakdown of the computers in these labs.

Educators also felt that they were not adequately consulted on the implementation of the computer lab. This left them with the feeling that they were not able to improve on the working conditions of the computer labs.

3.9. Summary

Table 3.3 summarises the theories discussed in this chapter.

<table>
<thead>
<tr>
<th>Theories used in studies on Motivation</th>
<th>Summary of the Theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hoppock’s Theory on Job Satisfaction (Hoppock, 1935)</td>
<td>This theory marked the start of the theories used in the study of job satisfaction. The approach to the study was simplistic in nature, consisting of four general, unspecific questions relating to job satisfaction.</td>
</tr>
<tr>
<td>Maslow’s Hierarchy of Needs Theory (Maslow, 1943)</td>
<td>This theory posits that human beings have needs and that these needs need to be satisfied. These needs can be arranged into a sequence reflecting importance, with the most basic needs situated at the bottom and moving upwards to higher level needs. As an individual satisfies his/her lower level needs, the individual will then move onto needs at a higher level.</td>
</tr>
<tr>
<td>Herzberg’s Motivation-Hygiene Theory (Herzberg et al., 1959)</td>
<td>This theory posits that there are certain factors in the workplace that would influence an employee in terms of their levels in job satisfaction or job dissatisfaction. Motivation factors influence job satisfaction and hygiene factors influence job dissatisfaction.</td>
</tr>
<tr>
<td>Theories used in studies on Motivation</td>
<td>Summary of the Theory</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>Social Cognitive Theory (Bandura, 1986)</td>
<td>This theory posits that people are more than reactive organisms responding to environmental forces and their inner pulses, but should be viewed as self-organising, proactive, self-reflecting and self-regulating organisms. The dynamic interaction between the personal factors, behavioural and environmental influences, is a product of human functioning. The reciprocal nature between behavioural, personal and environmental factors means that the individual interpreting the results of his/her behaviour will have an informing and altering action on the individual’s environment and personal factors, which will then inform and alter the subsequent behaviour of the individual.</td>
</tr>
<tr>
<td>Theory of Planned Behaviour (Ajzen, 1991)</td>
<td>This theory posits that human behaviour is driven by behavioural intention which is influenced by the individual’s attitude to the behaviour, the subjective norm and the individual’s perceived control over the behaviour.</td>
</tr>
<tr>
<td>Teacher Self-efficacy model (Hoy et al., 1998)</td>
<td>This theory posits that the educator’s views on his/her capabilities would influence how successful the educator would be in getting learners to participate in the teaching process.</td>
</tr>
</tbody>
</table>

Even though Herzberg’s Motivation-Hygiene theory has been around for a long while, recent ICT related studies using the theory showed that the theory is still relevant today.
4. Research Methodology

4.1. Introduction
This chapter sets the context for choosing an appropriate research methodology for this study by discussing the current literature available on the different research paradigms. Comparisons between the different research approaches are made and, based on their relevance to the current research, the most appropriate research approach was chosen. The chapter starts off by explaining the importance of the underlying philosophical assumptions made by the researcher, and how these assumptions act as a guide for the study. Section 4.2 outlines the backdrop of the case study and explains why a qualitative, interpretative research approach was used.

4.2. Philosophical Perspective
When looking at the philosophical perspective of the research at hand, there is a need to consider the underlying epistemology which will be used to guide the research (Myers, 1997). Hirschheim (1992) explains the term epistemology as the underlying assumptions the researcher has made in relation to the knowledge and how this knowledge will be obtained. Based on the underlying research epistemology, Baroudi and Orlikowski (1991), incorporating Chua (1986) identified these three categories: positivist, interpretive and critical.

An assumption in positivist research is that reality can be defined from an objective perspective and that this reality can be described using properties that are measurable. These properties are also seen to be separate and independent from the researcher and the researcher’s instrument. Positivist research studies generally seem to focus on testing theory. Testing of theory is an attempt to further understand particular phenomena by increasing its predictive nature (Myers, 1997). Baroudi et al. (1991) classify Information Systems (IS) research as being positivist when it meets the following criteria:

- having evidence of formal propositions
- quantifiable measures of variables
- carrying out hypothesis testing
- drawing of inferences about the phenomenon from the sample to a stated population

The assumption in interpretive research is that reality is a result of social constructions such as language, consciousness and shared meanings. Generally interpretive studies want to understand particular phenomena, by investigating and understanding the meaning people assign to the phenomena (Myers, 1997). The same is true in IS interpretive research where the research attempts to understand the information system and its surrounding context, as well as the influencing relationships between the information system and its surrounding context (Walsham, 1993).
The assumption in critical research is that the social reality is a result of historical events and that this social reality is produced and reproduced by people. Although the belief is held that people can consciously act towards changing their social and economic circumstances, these individuals face strong challenges in the form of social, economic, cultural and political domination. The main role of critical research is to critically comment on these social conditions that lead to the restrictive and alienating conditions. This social comment will shed light on these dominating conditions and help to emancipate the people from these dominating conditions (Myers, 1997).

This study attempted to unpack and understand the meaning assigned by educators to the challenges and opportunities experienced with ICT initiatives. In order to obtain information that is rich in nature, the research approach needed to encourage participants to talk about their perceptions and experiences relating to the implementation and use of ICTs within the classroom. Through interactive discussions, a deeper understanding of the phenomenon was obtained. For this reason, the underlying epistemology of the study was interpretive in nature. The researcher saw an interpretive research approach as the best option to obtain the views and opinions of the individuals.

### 4.3. The Research Paradigm

#### 4.3.1. Selecting a Quantitative or Qualitative Approach

Research approaches can be divided into Quantitative and Qualitative research. Quantitative research is generally positivistic, i.e. it is objective in nature and the purpose of the research is to measure phenomena. During the quantitative approach, numerical data is collected and analysed, using statistical methods and tests (Hussey & Hussey, 1997). Kruger, Mitchell and Welman (2005) go further to say that quantitative research should be restricted to what is observed and which can be measured objectively. Furthermore, quantitative research needs to exist independently from the feelings and opinions expressed by individuals.

Qualitative research, on the other hand, is more subjective in nature. The qualitative approach involves examining and reflecting on perceptions. This reflection is needed in order to gain an understanding of social and human activities (Hussey & Hussey, 1997). Kruger et al. (2005) add that, when using qualitative research, it is inappropriate to follow the strict natural-scientific methods advocated in quantitative research when the researcher is collecting and interpreting data. The proponents of qualitative approaches to research stress that the quantitative approach may not be suitable when studying phenomena in the human behavioural sciences. In qualitative research the human experience is the central focus when it comes to human behavioural research, and the human experience cannot be separated from the person experiencing it. Kaplan and Maxwell (1994) elaborate further that this human experience is lost when the textual data is quantified.
The focus of this study was to understand the human experience and personal perspectives of educators involved in using ICTs as a teaching tool in curriculum delivery. The researcher wanted to get the respondents to discuss their opinions and experiences on the use of ICT technology in delivering the teaching curriculum. The main goal from these discussions was to identify themes expressed by educators that either motivate or hinder the implementation of ICT initiatives. Since the study was an investigation into the behaviour of educators within a school setting, a qualitative research approach was deemed best suited for this study. It should be noted, however, that qualitative research does not automatically mean that the research will be interpretive in nature. Qualitative research could be positivist, interpretive or critical in nature, depending on the underlying philosophical assumptions of the researcher (Myers, 1997).

4.3.2. Qualitative Research Methods

Myers (1997) refers to a research method as a strategy of inquiry which can be traced from the underlying philosophical perspectives to the research design, and then leading to the task of data collection. The data collection task is influenced by the researcher’s choice of research method. Four common qualitative research methods referred to in literature are: case study research, action research, ethnography and grounded theory.

The case study is seen as an ideal methodology when holistic, in-depth investigation into a particular phenomenon is needed (Feagin, Orum & Sjoberg, 1991). Case study research is directed at understanding a particular case in all its complexity, including those characteristics that make the case unique (Kruger et al., 2005). Yin (2002) defines a case study as an empirical inquiry that:

- sets out to investigate a contemporary phenomenon that occurs within a real-life context
- where the boundaries between the particular phenomenon and the context within the phenomenon are not clearly visible

Action research can be defined as a “systematic inquiry that is collective, collaborative, self-reflective, critical, and undertaken by the participants of the inquiry.” (Jung & McCutcheon, 1990, p. 148). The goal of action research is to find a solution to a particular problem occurring in a specific, applied setting. Action research is similar to case study research in terms of referring to a problem situation. However, it differs from a case study in terms of not just describing the problem situation, but also searching for a solution (Kruger et al., 2005).

During ethnographic research, researchers are expected to stay in the field for a considerable amount of time and immerse themselves in the lives of the people they are studying. From this immersed position, the researchers will attempt to discuss particular phenomena from their own social and cultural context (Lewis, 1985).
Grounded theory is "an inductive, theory discovery methodology that allows the researcher to develop a theoretical account of the general features of a topic while simultaneously grounding the account in empirical observations or data" (Martin & Turner, 1986, p. 141). Grounded theory differs from the other qualitative research methods in the way of theory development. In grounded theory there is a continuous interchange between the collection of data and data analysis (Myers, 1997).

For this study a case study research method was selected because the study needed to conduct an in-depth investigation into factors impacting on the success of ICT initiatives within schools. These factors are based on the perceptions and experiences of educators involved in ICT initiatives within schools. The question that was asked was: What factors are impacting on ICT initiatives within schools? According to Yin (2002), exploratory case studies are best suited to answer the 'what' research questions, and, based on this, an exploratory case study approach was adopted. One of the important considerations to take into account when selecting a case is its feasibility. The case that is selected needs to be willing to participate in the study, and more importantly, must be willing to provide access to the information you need. This willingness also includes being allowed access to the people you need to interview in order to get the information (Kathan, 2007).

4.3.3. Case Study Selection
The backdrop of the case study was the Khanya project and for this reason the sample included those schools that are part of the Khanya project and are referred to as "Khanya schools". Due to resource-constraints and time-constraints, the focus of the study was in the Cape Town area, which was seen as a convenient location. The two schools that took part in the study were selected from a list of high schools that were part of the Khanya project. Both schools had a Khanya lab at the school. An additional criterion was to choose schools that were not identified as among the more affluent schools. The reason for choosing schools in underprivileged areas was to determine how the limited resources available to schools influenced the success of the ICT school initiatives.

One of the reasons for selecting two schools instead of one school was that the researcher wanted diverse views from the educators interviewed on the factors impacting on ICT school initiatives. Two schools also allowed the researcher the opportunity to verify common themes that ran across the two research sites which added to the uniformity of the study and also validated the themes that developed during the data analysis process. Conducting interviews at the second school, the researcher noticed that themes were being repeated and for this reason a third school was not included in the study. A third school would have added minimal valuable information to the study.

Permission was obtained from the Provincial Department of Education in order to conduct the study (see Appendix B, C and D for the Interview Content Form, Confirmation Letter of Study and the
Application Research Form). One of the conditions of the permission was that no school was obligated to be part of the study. The schools were completely free to decline the invitation to be part of the study. The researcher approached the school management and presented the intention of the study. Some schools that were approached declined the request to be part of the study. The reasons cited for not wanting to be part of the study were a lack of time and workload issues. The researcher worked through the list of schools until two schools agreed to be part of the study. The schools were part of the Metro Central Education District. The fact that the schools were both from the Metro Central Education District provided uniformity and convenience to the study. Schools from the same district would increase the chances that these schools had experienced similar successes and challenges with regard to their ICT school initiatives. This similarity adds to the uniformity of the study. The reason for choosing a sample of convenience is further discussed in Section 4.6 relating to the scope of the study and the limitations associated with the study.

The reason for choosing high schools was that learners at high school level are preparing themselves for further education or entering the job market once they have completed their high school education. At this time in the learner’s development, it is important to have educators who inspire learners to develop the ICT skills needed to be successful in a knowledge-based society (Castro, 2003). Choosing only high schools also provided the researcher with a uniform study sample which allowed the researcher to also investigate the uniformity between the factors identified by the educators at the two schools. Using only high schools with similar social, economic and financial backgrounds meant that the educators teaching at the high schools probably had similar challenges. These challenges extended to include the use of ICT resources in education. In both schools, ICT resources were used by high school educators to teach the same subjects at the same educational level. A similar learner population across both schools meant that the educators dealt with similar challenges. In order for educators to be an inspiration to their learners, they themselves need to have high levels of morale, feel motivated and be satisfied with their job. In the long run, the success of ICT school initiatives depends on educators who are motivated to use ICTs in their classrooms.

4.3.4. Data Collection Techniques

Yin (1994) and Stake (1995) identified the following six sources of evidence that can be used in case studies:

- Documents – for example, letters, memos, administration documents and newspaper articles.
- Archival records – for example, service records and other organisational records.
- Interviews – for example, structured interviews, open-ended interviews and focused interviews.
- Direct observation – when the researcher conducts a field visit during the case study. This visit is to provide additional information on the phenomenon being studied.
- Participant observation – when the researcher becomes actively involved in the events being studied.
- Physical artefacts – for example, the researcher could collect physical evidence, tools and other instruments during the field visit. These objects collected could add to the broader understanding of the phenomenon being studied.

All these sources have their own strengths and weaknesses and Yin (1994) recommends that these sources should be used in tandem to complement each other and to get the maximum benefit from using the sources. Table 4.1 presents the strengths as well as weaknesses of each type of source.

**Table 4.1: Examples of Sources used as Evidence (Yin, 1994)**

<table>
<thead>
<tr>
<th>Source of Evidence</th>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
</table>
| Documentation      | - Stable - repeated review  
                    - Unobtrusive - exist prior to case study  
                    - Exact - names etc.  
                    - Broad coverage - extended time span | - Retrievability - difficult  
                    - Biased selectivity  
                    - Reporting bias - reflects author bias  
                    - Access - may be blocked |
| Archival Records   | - Same as above  
                    - Precise and quantitative | - Same as above  
                    - Privacy might inhibit access |
| Interviews         | - Targeted - focuses on case study topic  
                    - Insightful - provides perceived causal inferences | - Bias due to poor questions  
                    - Response bias  
                    - Incomplete recollection  
                    - Reflexivity - interviewee expresses what interviewer wants to hear |
| Direct Observation | - Reality - covers events in real time  
                    - Contextual - covers event context | - Time-consuming  
                    - Selectivity - might miss facts  
                    - Reflexivity - observer's presence might cause change  
                    - Cost - observers need time |
The educators' perspective of the factors that influence the success of ICT School Initiatives within the Western Cape

<table>
<thead>
<tr>
<th>Source of Evidence</th>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
</table>
| Participant Observation | Same as above  
Insightful into interpersonal behaviour | Same as above  
Bias due to investigator's actions |
| Physical Artefacts | Insightful into cultural features  
Insightful into technical operations | Selectivity  
Availability |

Face to face, in-depth, semi-structured interviews were used in the study to obtain the rich qualitative information necessary to answer the research questions posed. All the interviews were recorded using an audio recording device. A total of four and a half hours of interview time was recorded. The reason for the recordings was to allow the researcher to transcribe the interviews. The transcribed interviews were used during the analysis process. Microsoft Office was used as the software tool to transcribe the recorded interviews, followed by the coding process in order to establish the concepts, categories and themes (Corbin & Strauss, 1990).

The interviews were conducted with ten educators, one Khanya representative and one of the Khanya partners (ICT School Trainer) who provided educator training in Khanya schools. Four separate interview prompt sheets have been designed for the study (see Appendix E). Specific prompt sheets were used to interview the educators, a Khanya representative and a partner to Khanya who provides educator training in Khanya schools. Educators are central to the success of ICT school initiatives and, for this reason the focus of the study was predominantly on educators who were presently using ICT resources in teaching. All the educators selected for the study were using ICT in teaching. Some educators were more pro-active in their use of ICT resources than others. These differences in attitude towards the use of ICT resources in education could impact on the success of ICT school initiatives. The value that the educators brought to the study was that they were familiar with the factors that either motivate or hinder educators when using ICT resources in curriculum delivery.

The backdrop to the study was the Khanya project and, for this reason, it was important to include a Khanya representative in the study. The Khanya representative was a senior member of staff in the Khanya office and had been involved with the Khanya project for many years. Her input was important for the study and represented the viewpoint of the Khanya office. Educator preparation for the use of ICT resources in education plays an important part in the success of ICT school initiatives. The ICT School Trainer was a representative of an organisation that was responsible for training
educators in the use of ICT resources in education. This organisation was also a partner to the Khanya project. The representative was a senior member of staff in his organisation, and provided his perspective on the successes as well as the difficulties experienced by the organisation, when it came to the training of educators in order to use ICT resources in education.

4.4. Data Analysis

The principles of open coding were used to analyse the data collected. The coding process was used to work towards establishing the emergent concepts and categories (Corbin & Strauss, 1990). The concept of theoretical saturation as defined by Eisenhardt (1989) was followed during data analysis. The idea was to define enough categories and associated concepts to explain the phenomena being studied. At this point, any additional learning is minimal and themes are being repeated during the data analysis process (Glaser & Strauss, 1967). During data analysis, the researcher initially went through the interviews highlighting the passages where educators spoke about situations that would either motivate or hinder the use of ICT resources in the classroom. The passages were then grouped under themes that developed during the data analysis. These themes were then placed under the logical categories associated with Herzberg’s Motivation-Hygiene theory.

The study used an interview coding strategy similar to the one used by Miller et al. (2006). The coding strategy was designed to provide confidentiality to the individuals being interviewed and also provides a system by which to link educators to a particular school. Schools were coded as Sx, where the letter S indicates a school and the letter x indicates the school number i.e. either 1 or 2. Educators were coded as Sx.Tn where the letters Sx indicates their school and Tn indicates a particular educator in the school. The letter n ranged from 1 to 5. The Khanya representative was represented as “Khanya Rep” and the organisation involved in training educators in Khanya schools was represented as “ICT School Trainer”. Tables 4.2 and 4.3 provide details of the respondents.

**Table 4.2: List of Educators Interviewed**

<table>
<thead>
<tr>
<th>Educator Code</th>
<th>Role in School</th>
<th>Level of Education</th>
<th>Date of Interview</th>
<th>Years in Education</th>
<th>Years at Current School</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1.T1</td>
<td>Educator</td>
<td>Higher Diploma in Education (HDE)</td>
<td>24/03/2009</td>
<td>12 years</td>
<td>8 years</td>
</tr>
<tr>
<td>S1.T2</td>
<td>Educator + LAN Administrator</td>
<td>Higher Diploma in Education (HDE)</td>
<td>17/03/2009</td>
<td>25 years</td>
<td>6 years</td>
</tr>
<tr>
<td>S1.T3</td>
<td>Educator</td>
<td>Higher Diploma in Education (HDE)</td>
<td>31/03/2009</td>
<td>29 years</td>
<td>10 years</td>
</tr>
</tbody>
</table>

### Table of Educators Interviewed

<table>
<thead>
<tr>
<th>Educator Code</th>
<th>Role in School</th>
<th>Level of Education</th>
<th>Date of Interview</th>
<th>Years in Education</th>
<th>Years at Current School</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1.T4</td>
<td>Educator + Member of School Management (3 to 4 years)</td>
<td>B.Sc. Degree + B. Com Degree + Higher Diploma in Education (HDE)</td>
<td>17/04/2009</td>
<td>-</td>
<td>30 years</td>
</tr>
<tr>
<td>S1.T5</td>
<td>Educator</td>
<td>B. Ed. Degree</td>
<td>25/03/2009</td>
<td>3 years</td>
<td>3 years</td>
</tr>
<tr>
<td>S2.T1</td>
<td>Educator</td>
<td>B. A. Degree + Post Graduate Certificate of Education</td>
<td>29/04/2009</td>
<td>3 years</td>
<td>2 years</td>
</tr>
<tr>
<td>S2.T2</td>
<td>Educator + Vice Principal</td>
<td>B.A. Degree + Higher Diploma in Education (HDE)</td>
<td>29/04/2009</td>
<td>19 years</td>
<td>19 years</td>
</tr>
<tr>
<td>S2.T3</td>
<td>Educator</td>
<td>National Diploma in Education</td>
<td>29/04/2009</td>
<td>3 ½ years</td>
<td>About 2 years</td>
</tr>
<tr>
<td>S2.T4</td>
<td>Educator</td>
<td>Higher Diploma in Education (HDE)</td>
<td>30/04/2009</td>
<td>Between 12 &lt; 15 years</td>
<td>4 years</td>
</tr>
<tr>
<td>S2.T5</td>
<td>Educator + LAN Administrator</td>
<td>B.A. Degree</td>
<td>28/04/2009</td>
<td>19 years</td>
<td>5 years</td>
</tr>
</tbody>
</table>

### Table 4.3: List of Additional Interviews

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Job Level</th>
<th>Date of Interview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Khanya Representative (Khanya Rep)</td>
<td>Director</td>
<td>28/01/2009</td>
</tr>
<tr>
<td>ICT School Trainer</td>
<td>Director</td>
<td>11/12/2008</td>
</tr>
</tbody>
</table>

### 4.5. Ethical considerations

The researcher obtained permission from each respondent before conducting the interviews. This consent allowed the researcher to record the interviews as well as use the information in the research process. The researcher has made all efforts to keep the identities of all the respondents confidential, as well as maintain the privacy of all the information collected during the research process. Only the researcher and his supervisor will have access to the information, and this information will be kept safe through protecting the data files with password encryption. A copy of the results from the study will be made available to the respondents on request. The interview prompt sheets have been submitted to the Ethics Committee in the Department of Information Systems at the University of Cape Town for ethics approval (see Appendix E).
4.6. Limitations of the study

The limitations of the study are identified as follows:

1. The study was conducted within tight time deadlines and strict budget constraints. These limitations restricted the scope of the study in order to have a research focus that is achievable within these limitations identified.

2. Before the schools could be approached with the intention to include them in the study, the DoE required that the researcher identify the relevant research sites. This process was made cumbersome when schools declined the invitation to be part of the study. This upfront selection process of the research sites could impact on whether the findings of the study could be generalized to the broader South African school system. The researcher, however, strived to select research sites that fitted the definition of previously disadvantaged schools.

4.7. Summary

The purpose of the study was to determine factors that impact on the success of ICT school initiatives, with the focus being on educators and their view of the factors that impact on the success of ICT school initiatives. In order to get a holistic view of these factors, an in-depth investigation was needed. The literature indicated that a case study research method was best suited when a holistic, in-depth investigation into a particular phenomenon was needed and for this reason the case study research method was adopted for this study. Continuing with the theme of unravelling the views of educators, a qualitative, interpretative research approach, using interviews as a research instrument, was identified as the best approach for the study. Interviews were conducted with educators that use ICT resources in teaching. To add an extra dimension to the study, a representative of the Khanya office as well as a representative of an organisation that trains educators to use the Khanya lab, were also included in the study.
5. Case Descriptions

5.1. Introduction
The focus of the Khanya project is on the implementation and use of ICT resources in curriculum delivery by the schools in the Western Cape. The schools therefore play an important role in the success of the ICT investment made by the Khanya project. Since the study focuses on schools that have implemented the Khanya lab and since the success of an ICT project may be context-dependent, it is important to discuss the schools in detail. The purpose of this chapter is therefore to provide a description of the two schools that were included in this study. The standard technical specifications for a Khanya lab are provided in Appendix F.

Both schools are public, co-educational (i.e. cater for both boys and girls) and located in the Cape Town Metro Central Education District. The teaching language at both schools is English. The schools mainly cater for underprivileged communities – most of the learners come from underprivileged backgrounds. This has an implication on the use of the technology in the schools. Firstly, most learners have no prior ICT skills and therefore need to be taught how to use the technology before they could use it for learning the various subject areas. Secondly, the learners have no opportunity to practise on the technology outside their allocated computer lab time at school. The respondents (educators) from both schools indicated that the implementation of the Khanya lab had a significant impact on their schooling and that detailed planning was needed to prepare the school for the changes needed once the Khanya lab had been implemented at the school. A lack of proper planning could result in a significantly negative impact on the success rate of the Khanya project at the school. The areas of impact identified by the educators are: Ownership, Capacity, Integration, Learner Preparation, School Leadership, Relationships and Training. The themes introduced in this chapter form a basis for detailed discussions in Chapters 6 and 7.

5.2. Case Description: School S1
The school had 1 113 learners and 35 educators. The first Khanya lab at the school was opened in 2006. At the time of the data collection, the school had one Khanya lab with 25 computers. Before the implementation of the Khanya lab the school had one computer lab that had five outdated computers (486 processors). Due to the operational limitations of these computers, as well as the fact that there were only five computers, the usage of the computer lab for teaching was significantly limited (Khanya, 2008d). The official focus of the Khanya lab at the school was geared towards English and Mathematics, however, one of the educators interviewed used the Khanya lab for Business Studies.

5.2.1. The ICT skills for educators at School S1
All the educators at the school went for the Khanya basic computer literacy training. The LAN Administrator went on additional LAN Training which was also provided by Khanya. The LAN Administrator and one other educator went on additional advance ICT training and completed their
International Computer Driver’s Licence Course. The LAN Administrator was already au fait with computers and the mechanics of how a computer lab worked before the Khanya lab was implemented at the school. As part of his own development, the LAN Administrator was interested in Information Technology (IT) installations as well as repairing faulty computers and practised these ICT skills whenever he had an opportunity. The ICT skills of the LAN Administrator were an advantage to the school since the LAN Administrator was in a position to provide technical assistance to the school from the implementation of the Khanya lab at the school.

Educators who understood the value of the computer lab tried to actively incorporate the use of the computer lab into their teaching. An educator that has been in education for 29 years highlighted that she was a “technophobe” before the Khanya lab. She now felt empowered when she used the Khanya lab in her classroom. For this educator, being able to use Excel to teach data handling concepts made teaching so much easier. Some educators, however, highlighted that the training provided by the Khanya project was not creating a “solid foundation” for the educators. Part of the problem was that “there was no follow-ups” after training and the training was “a once-off”. The result was that educators were not confident in their abilities to use the computer lab in the classroom.

5.2.2. The Khanya lab and Ownership
Since the LAN Administrator had already been using ICT resources in his classes, he understood the value that the Khanya lab could add to teaching. Initially the LAN Administrator was excited about the prospect of having a Khanya lab at the school. He thought that the computer lab would be an opportunity for all educators as well as learners to get introduced to IT. After the implementation of the lab, the LAN Administrator became aware that access to the Khanya lab would be strictly regulated and that the computer lab was to be used exclusively for Mathematics and English subjects.

This lack of ownership made the LAN Administrator and school management feel powerless vis-a-vis the management and administration of the computer lab. For this reason the LAN Administrator lost interest in the computer lab. The “red tape” around the use of the computer lab made it difficult for the LAN Administrator to give lab access to the learners who did not have formal access to the computer lab. He could only give them access outside school time.

5.2.3. The Khanya lab and Capacity
The lab which the school had before the implementation of the Khanya lab was not capable of supporting the learners at the school for two main reasons: (1) the computer lab had outdated technology and (2) there were too few computer workstations for the learners in the school. The implementation of the Khanya lab provided the school with modern technology with which educators and learners could access the internet and use e-resources in their teaching and learning exercises.
However, the educators at School S1 felt the computer lab’s capacity of 25 computers was still inadequate. Due to the class sizes, learners had to share computers which hindered the effective use of the technology for teaching. Some educators suggested a bigger computer room with more computers, or an additional computer lab, to address the capacity limitations. Unfortunately, the financial constraints at the school made this impossible.

5.2.4. The Khanya lab and Integration of ICT in curriculum delivery
The data shows that the school did not perceive the use of the computer lab as a priority in terms of the day-to-day operation of the school. This was particularly evident by the timetable of the school – the timetable had no specific time scheduled for the use of the computer lab in teaching. The current position at the school resulted in some educators not using the ICT resources in their teaching. One educator indicated that during the day-to-day hustle of teaching, educators forget about using the computer lab, because there is no formal teaching timeslot specified on the timetable for them to use the computer lab, in order to achieve the learning outcomes that form part of the school curriculum. The following quotation confirms this statement:

...if you look at the structures of school, it’s very structured. There is a certain amount of work that you need to cover in terms of context and I actually think that educators don’t even think of using the computers and integrating it as a part of their lesson [S1.T5]

5.2.5. The Khanya lab and School Leadership
The Khanya representative, the ICT School Trainer and some educators in School S1 stated that the school leadership needed to champion the Khanya lab at the school and should encourage proactive integration and use of the ICT resources by the educators in curriculum delivery. In order to achieve the successful integration and use of ICT resources within the school, the school leadership needed to create a clear vision and a purpose for the Khanya lab within the school. A clear vision and purpose set by the school management would facilitate a change in the school culture towards the use of ICT resources in education. Educators at S1 felt that the school management was not actively playing a role in championing the use of ICT resources in education.

5.2.6. The Khanya lab and Relationships between different stakeholders
The relationships amongst educators in the school did not support the empowerment of educators in their use of the computer lab. The support was informal and educators would ask one another for assistance in the corridors or when they saw one another. There was no clear mention in the interviews of a support committee at the school and this was one of the hindrances to the success of the Khanya lab at the school. The school management should be the champion of the Khanya lab in this regard in order to change the culture in the school towards educators supporting one another and to create support structures for the educators.
Sharing knowledge amongst educators who were using the computer lab had its own challenges and an educator stated that "there's a lot of selfishness" amongst the educators. For instance, there were educators that were experts in Excel but they did not share their knowledge with the other educators. This meant that there was no real empowerment of educators. The LAN Administrator was also a fulltime teacher and, due to time constraints imposed on the educator by his teaching obligations, the LAN Administrator was unable to provide an effective support function to those educators who were using the computer lab.

5.3. Case Description: School S2

The school had 440 learners and 14 educators. The first Khanya lab at the school was opened in 2006. Similar to School S1, at the time of data collection, School S2 had one computer lab with 25 computers (Khanya, 2008d). Similar to School S1, the official focus of the Khanya lab was geared towards English and Mathematics. However, one of the educators used Encarta for one of the Technology subjects.

5.3.1. The ICT skills for educators at School S2

Before the implementation of the Khanya lab, the educators had basic computer literacy skills. The LAN Administrator indicated that he had only started developing his IT skills after the Khanya lab was implemented. He understood little about the mechanics of the computer lab and how the hardware and software fitted together. After the LAN training, the LAN Administrator felt more comfortable with supporting the computer lab. All educators went on the basic computer literacy training provided by Khanya. However, some of the educators highlighted that the training provided by Khanya was not adequate and educators were ill-prepared to deal with technical challenges that occurred in the computer lab.

An additional complication was that some learners were more computer proficient than the educators tasked with the responsibility of using the technology to teach their subject area in the computer lab. Educators struggled to keep technically astute learners at bay. During the interviews, the LAN Administrator suggested that there was a need to up-skill educators on the technology used in the computer lab. There was a need for continuous ICT training for educators that went beyond the basic computer training. The LAN Administrator also indicated that he had applied to Khanya for "LAN 2 Training" as part of his continuous improvement and personal development. At the time of data collection, there was no real backup at the school for the LAN Administrator. The LAN Administrator suggested that this gap was a risk to the school and suggested that more educators go for LAN training in order to be able to support and assist the computer lab on a technical level as well.
5.3.2. The Khanya lab and School Leadership

As with School S1, the school leadership was perceived as not actively playing the role of ICT champion at the school. Since there was no clear vision and purpose for the Khanya lab in the school, not all educators and learners understood the importance of the Khanya lab in education and this uncertainty amongst the educators impacted on the degree and level to which the Khanya lab was used within the classroom. The LAN Administrator also highlighted the relationship between the school management, educators and the Khanya office as a challenge and stated that “rarely do they really consult teachers on these labs and I think we can make a contribution because we use it in the end”. A lack of communication and active consultation between the school management, educators and the Khanya office was cited as a reason for this problem.

The “grey area” for educator S2.T4 was that he did not understand how the development of ICT skills related back to the school curriculum. The gap could be related to not having a clear vision and purpose for the Khanya lab and not having a strong leadership to communicate the value that the Khanya lab could add to the school. The following quotation confirms the challenge of the educator:

… in terms of the education department, I think they haven’t bridged the gap of where they want to take this so this is going to take some time… [S2.T4]

The educator believed that the Khanya lab could add value to the school, but at that moment this value was not visible or clearly understood.

5.3.2. The Khanya lab and Capacity

As with School S1, at the time of data collection, the school had one Khanya lab with 25 computers. Most educators identified the capacity of the computer lab as a problem. The reason for this was that on average the number of learners in the classroom was more than 40 and it was a challenge to accommodate all the learners in the computer lab at the same time. Learners had to either split into two groups or share one computer between themselves which then hindered the effective use of the computer lab for teaching. Some educators suggested a bigger computer room with more computers or an additional computer lab. Acquiring additional ICT resources was an unlikely option due to the school’s financial position.
5.4. Summary
Table 5.1 summarises the attributes associated with both schools.

**Table 5.1: Summary presentation of the attributes associated with both schools**

<table>
<thead>
<tr>
<th>School Attributes</th>
<th>School S1</th>
<th>School S2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year when Khanya lab was installed</td>
<td>2006</td>
<td>2006</td>
</tr>
<tr>
<td>Language of Education</td>
<td>English</td>
<td>English</td>
</tr>
<tr>
<td>No of Computer labs</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Number of learners</td>
<td>1113</td>
<td>440</td>
</tr>
<tr>
<td>Number of educators</td>
<td>35</td>
<td>14</td>
</tr>
<tr>
<td>No of Computers</td>
<td>25 + 5 old machines</td>
<td>25</td>
</tr>
<tr>
<td>Public/Private</td>
<td>Public</td>
<td>Public</td>
</tr>
<tr>
<td>No of LAN Administrators</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Khanya Subject Focus</td>
<td>English and Mathematics</td>
<td>English and Mathematics</td>
</tr>
</tbody>
</table>

The educators agreed that the computer lab had the potential to have a positive impact on teaching at the school. The proactive use of ICT resources could empower educators and learners by providing them access to a world of e-resources through the use of the internet. Educational resources such as Cami Maths and Cami English are used by educators to address the low levels of learner literacy and numeracy at the school. Schools, however, need to be aware of, and be prepared for, the impact that the Khanya lab would have on the school. Lack of proper planning could impact on the school negatively. Areas of impact identified by the educators are: Ownership, Capacity, Integration, Learner Preparation, Relationships, Training and School Leadership.
6. Motivational factors when using ICT resources in teaching

6.1. Introduction

Motivational factors, also referred to as intrinsic factors, are those factors that are associated with the job itself. Motivational factors encourage workers to improve their performance within a particular job. Motivational factors also work to increase job satisfaction. Figure 6.1 is a schematic representation of the categories and themes identified during the data analysis of the transcribed interviews in the study. In this chapter, the findings associated with the motivational factors will be discussed under the following categories: Work Itself, Achievement and Responsibility.

The Work Itself category refers to the actual content of the job, what the individual is asked to do at work (Examstutor, 2008; Herzberg, 1968/1987). Educators are responsible for teaching learners at school, so in this study the Work Itself category refers to the teaching activities at the school. The Responsibility category refers to the taking of ownership by individuals for the activities of their job (Herzberg, 1968/1987). In this study the Responsibility category refers to educators taking charge of their own IT development towards the successful use of the ICT resources in the school. The Achievement category refers to individuals being successful in completing tasks associated with their job and these achievements lead to these individuals experiencing “psychological growth” (Herzberg, 1968/1987).
6.2. Work Itself

The following themes are associated with the Work Itself category:

- Value Add of ICT school initiatives
- The impact of computers on the teaching activity
- Educator support in ICT curriculum integration
- Learner preparation for ICT curriculum delivery.

6.2.1. Value Add of ICT school initiatives

There seemed to be an agreement amongst the respondents that the Khanya labs can be positive and can add to the teaching experience. The respondents expressed varying opinions vis-a-vis the value that ICT added to the school and to teaching. The respondents identified the following areas where the Khanya lab can add value to the school and teaching:

- teacher development
- improving the teaching and learning environment
- providing educational resources such as Master Maths, Mindset and Encarta
• the preparation of learners for the working world

The respondents also identified the following areas of concern which reduce the value added by the Khanya lab to the school and teaching:

• the relevance of ICT resources in teaching
• the Khanya lab not meeting the expectations held by the educators
• limitations around the use of the Khanya lab which include issues of the lack of access to the computer lab as well as capacity issues
• lack of tangible measurements relating to actual improvement of educators and learners when using the computer lab
• lack of integration of the ICT resources into the school and the teaching curriculum

6.2.1.1. Benefits – Factors motivating the Value Added by the Khanya lab

According to some respondents, the value that the Khanya lab added to the school and teaching came in the form of educational resources. Having a computer lab at the school as an educational resource improved the educational environment in the school. Prior to Khanya, School S1 had a computer lab with outdated computers. It can be said therefore that the introduction of the Khanya lab into the school provided the school with a second chance at having a computer lab. School S2 had never had a computer lab at the school so the introduction of the Khanya lab was the first time the school had access to computers as an educational resource. Both schools had limited financial resources, and on their own, would struggle to acquire ICT resources. Hence, being part of the Khanya project aided these schools in obtaining the ICT resources.

Some respondents agreed that educational resources in the form of educational programmes such as Master Maths, Cami, Encarta and the Internet access opened up a new world of learning opportunities. This meant that education within the classroom was not limited to the prescribed textbook. It was clear from this response that access to Internet resources has played an important role in expanding the boundaries of education. The respondents added that it was impossible for any individual to know everything and that the concept of lifelong learning and teacher development was made easier by having access to the internet.

Educator S1.T1 said that the impact of computers at the school had led to a change in the teaching climate at the school. The computer labs allowed educators to have lessons that were more interactive with both the educator and the learner participating in achieving the learning outcomes for a particular lesson. This was different from the traditional talk-and-chalk method where the educator stood in front of the class and the learners were passive observers during the teaching of the lesson. The computer lab has “a different atmosphere than in class” and the computer lab made learning “much, much easier for them.”
Respondents also highlighted the importance of preparing learners for the outside world after school, and one of the skills that school leavers need is to be computer literate. In order to obtain these skills, learners need to have access to the ICT resources within the school. The following quotations confirm this statement:

"...we need to bring them to the computer because the outside world is all about computers" [S2.T1]

"I thought it was long overdue that schools which cannot afford technology are exposed to technology with special references to the learners and getting them to work firsthand with the technology which is used in the practice on the outside world" [S2.T2]

Overall, half the educators in the sample agreed that the Khanya lab added value in the areas of teacher development; improving the teaching and learning environment; providing needed ICT educational resources and preparing learners for the working world. The educators would like to see the computer lab succeed - one educator said that he enjoyed using the computer lab and that he "don't want this to be a white elephant". The rest of the educators in the sample were less optimistic vis-a-vis the value added by the Khanya lab to the school and teaching.

6.2.1.2. Challenge – Factors hindering the Value Added by the Khanya lab

Convincing educators about the relevance of using ICT resources in teaching was a significant issue that the school management was faced with. The lack of appreciation about the relevance of using ICT resources in teaching was clearly highlighted by an educator in School S1. What was more interesting was that the educator was not only on the school management committee; he was also a Mathematics teacher. The educator did not see the relevance of using ICT resources in teaching Mathematics. There also seemed to be a lack of integration between the computer lab and teaching. The educator indicated that the effort required for "... the talk and chalk method for teaching Mathematics was 90% to 99% and the [and] technology [was about] 1%". The educator believed that by its nature Mathematics was a talk-and-chalk subject and that the computer lab played a minimal role in the teaching of Mathematics.

This particular educator said that Mathematics was a subject of concepts and that the computer could not be used to teach concepts. The teaching of concepts needed to be done by the educator in front of the blackboard. To this educator, understanding the concepts in Mathematics was paramount and technology came a distant second. The learners could understand the technology, but without understanding the concepts in Mathematics, the use of ICT resources in teaching Mathematics would be useless. The educator considered ICT resources as nice to have at the school but not really practical in teaching Mathematics at School S1. The following quotation confirms the educator’s viewpoint:
It can be helpful, but I still think Mathematics, my subject, is a talk-and-chalk subject ... the talk- and-chalk is 90% or 99% the technology is 1% ... if they don’t understand the concept they can’t do this so you have to understand the concept in order to do the technology [S1.T4]

The problem is deeper than simply resistance from the educator to the use of ICT resources for teaching. One of the underlying problems highlighted at S1 was that many of the learners in the school were struggling academically. According to a respondent, the primary school education most of the learners received did not adequately prepare them for doing high school level Mathematics. The educator stressed that the feeding schools from which their learners came from had not set a proper academic foundation for these learners, which meant that educators at the high school now needed to spend extra effort in trying to ‘fix’ this issue. The educators had to assist the learners by focusing on the basic Mathematical foundations and concepts. Without this foundation, the use of the computer lab would have little relevance in teaching Mathematics.

The fault did not lie with the educators or even the computer lab, but more with the rigid school structures that did not allow for the successful integration and use of the computer lab in teaching. Educators are expected to complete specific learning outcomes within set timeframes and, with the focus of educators being on this deliverable, the inclusion of the computer lab into teaching was not an immediate focus of educators teaching in their classrooms.

The value that the computer lab could add to both the school and teaching can be significantly reduced when the computer lab does not live up to the expectations set by the educators and the school. This was the case at School S1. According to educator S1.T2 who was also the LAN Administrator, he was enthusiastic about the process of getting a computer lab at the school. The respondent was already using ICT resources in his classroom, so he was aware of the benefits that the computer lab could bring to the school. These benefits included being exposed to ICT resources, having unlimited access to the latest educational resources via the internet and also developing the ICT skills of educators and learners. The educators at the school believed that all the learners would have access to the computer lab and that all subject areas would be accommodated in the computer lab. As part of the excitement, an article was published in the school newsletter about the Khanya lab saying that all learners and educators would have access to the computer lab.

This excitement quickly gave way to shock and disbelief when the educator was told by the principal that the Khanya lab would not accommodate all subject areas; subjects such as Mathematics and English would be given preference in the computer lab. Other rules imposed by the Khanya office controlled which grades at the FET and GET levels would have access to the computer lab. Ownership of the Khanya lab was also problematic. Apparently the educator was informed that, after a year or two, the Khanya lab would become the property of the school. Three years had already passed and the ownership of the Khanya lab had not yet shifted to the school. The educator felt that
the school had signed over a classroom for a Khanya lab, but did not get what was expected. The Khanya lab was still owned and controlled by the Khanya project and the school had little influence on the use of the Khanya lab. The problem was exacerbated by a degree of miscommunication between the key stakeholders during the initial discussions held about the implementation of the Khanya lab at the school, and what roles and responsibilities each stakeholder would be playing in this relationship. The following quotation confirms the confusion that existed with regards to the ownership and the use of the Khanya lab:

...before the Khanya lab, I used ICT in my classroom I have my own laptop. I have my own data projector, my own equipment...what made me excited about the whole project was an opportunity the whole school can be hosted in this room and every class could have an opportunity to experience exactly the same what my class did experience before the Khanya lab ....a big disappointment for me because I thought that we would have free reign as to the uses of this room but there's a lot of red tape regarding the usage of the Khanya lab. They prescribe who can use it and who cannot use it and when it can be used and when it cannot be used. So I mean that already put a damper on my interest in the Khanya lab. [S1.T2]

Educator S1.T5 added that “we living in a computer society” and her expectation of the Khanya lab was to train and develop learners from a young age in acquiring ICT skills so when they leave school they will be accustomed to using computers. In addition, the educator also expected the successful integration of the computer lab into teaching. The educator indicated that these expectations had not yet been met.

The lack of tangible measurements relating to actual improvement of educators and learners when using the computer lab was a challenge identified by a respondent from School S2. Without having these measurements, how would one know the success rates of ICT school initiatives? This quotation by the educator highlighted this gap:

...achieving better results I don’t know whether it can do that in that way. Yes, they have done their assignments, yes, they have can use the technology, but I doubt it whether it was to their advantage of improving their results [S2.T4]

6.2.2. The impact of computers on teaching

The use of computers in curriculum delivery would result in changes to teaching and learning activities. Educators and learners would both be impacted by this change. The responses of the educators to the technology would determine whether the outcome would be positive or negative. One of the major challenges of introducing ICT resources into schools was the shift from the traditional talk-and-chalk method of teaching towards a more interactive teaching style where educators and
learners positively interact throughout the learning process via the use of ICT resources (Chapman & Mahlk, 2004; Miller et al., 2006).

A strong school leadership, together with Khanya and the DoE would need to work together to prepare the educators for the introduction of ICT resources into teaching. Educators need a clear shift in mindset to do this. In order to shift the mindset of educators in relation to the use of ICT resources, it was imperative that the school management clearly outlined the relevance of the ICT resources in the school and the expectations that school management had of educators in relation to the use of the ICT resources in teaching (Miller et al., 2006).

A clear vision and purpose of the computer lab would create the framework needed in the school to successfully integrate the computer lab into the school. A quotation from the Khanya representative confirms the importance of getting educators to shift their mindset, towards the use of ICT resources in teaching and the role of school management in influencing this shift:

*The realisation that the technology is there not just for the sake of technology but for the sake of teaching is highly important, so, teachers have to have that mindset immediately that it's going to change the way we do things, again you need a strong team that leads the ICT committee [Khanya Rep]*

6.2.2.1. Benefits – Using ICT resources in teaching

Educators in the sample found the application of ICT resources in the teaching of Mathematics most rewarding. The ICT resources could be used in the drawing of graphs and charts. Prior to the Khanya lab, the educators had been drawing graphs and charts by hand and this exercise was time-consuming. After Khanya, educators used Excel for the task. Excel was also useful when teaching the learning outcome that deals with data handling. The Master Maths programme could also be used by the learners to find explanations to Mathematical concepts, as well as for more exercises to consolidate their learning. Mindset was also used to help learners who were struggling with the basic mathematical concepts. The advantage of using the computer lab for Mathematical projects was that the learners could use the ICT resources to create neat and professional looking documents instead of writing up their projects by hand. This benefit extended to the other subject areas as well. Ultimately, the major achievement was teaching learners to use the ICT resources in Mathematics. This quotation confirms this statement:

*...we can work with graphs. Learners do their projects on their Master Maths; they can go into the programme and have more exercises, explanations [S1.T1]*
The ICT resources were also used in other subject areas. For instance, one educator used ICTs for teaching Business Studies. The educator incorporated the ICT resources such as the internet, the Google search engine and the Learn Channel into her lesson. The benefit for her was having an interactive lesson where the educator and the learners actively participate in the learning experience. Another educator incorporated Encarta into his lesson plan. The benefit expressed by the educator was that most of the research work was done for the learners, which meant that the learners were able to use the information available on Encarta to complete their assignments. Having these resources available was especially valuable for schools that lacked educational resources. It can be said, therefore, that the ICT resources improved both the teaching and learning environment. Educators could also use the computer lab for research purposes. However, the use of the computer lab was limited when the computer lab did not cater for a particular subject area.

In School S2 the low levels of literacy and numeracy amongst the learners were a real concern to the educators. The educators in School S2 did, however, find creative ways of overcoming the learner literacy and numeracy challenges by using the available ICT resources in the school. These proactive steps taken by the educators in the school added value by preparing the learners for an ICT curriculum. The educators used the Cami programmes to deal with the low levels of learner literacy and numeracy. The quotation of the vice-principal from School S2 confirms this statement:

...the literacy and the numeracy problem and the lab just becomes another resource that we can use in order to overcome that problem [S2.T2]

6.2.2.2. Challenge – Educators’ concerns regarding the use of ICT resources in teaching
The LAN Administrator of School S1 expressed major concerns about the impact of ICT resources on him and his teaching. The respondent indicated that initially the computer lab had had a minimal impact on his life as an educator, and on his teaching. However, gradually the responsibility of supporting the computer lab grew to a point where the workload was too much to deal with. Initially, his responsibility was just to unlock and lock the computer lab. Gradually the responsibilities extended to include fixing technical glitches. Being a fulltime educator plus having to support the computer lab on a fulltime basis was a major challenge for the educator. The problem was further compounded by the fact that initially the school had had an IT Administrator on the staff that supported the computer lab, but he had left because of work pressures.

The following quotation confirms the statement of the educator that the significant workload in the computer lab had overwhelmed him:

_The burden is too great. That is how I see it. I’ve brought this to the attention of the office already and Khanyo. The one facilitator that we had here also spoke to our principal and he said “This guy must be relieved from his teaching position. He must be here [in the lab] so that_
everybody can feel comfortable to come in here. He must be here every period every day ... until such time that everybody is comfortable enough to work on their own” [S1.T2]

Not having enough ICT educational programmes available to the educator for teaching, impeded the use of the computer lab. An educator highlighted that this limitation impacted on the effectiveness of the educator using the computer lab for teaching. In some cases the educator had to repeat exercises, which resulted in the learners becoming bored and disinterested in the lesson and started to play games.

6.2.3. Educator support in ICT curriculum integration
Jones (2004) indicates that educators are central to the success of ICT interventions into schools. Educator support was therefore essential for the long-term success of the Khanya project (Du Toit, n.d.; Khanya, 2008a). Bingham and Byrom (2001) and SHAWCO (2001) agree that educator support is essential to ensure the successful integration of ICT resources into teaching. Without the support from school management educators showed a lack of motivation (Ashton & Webb, 1986; Ostroff, 1992). This lack of motivation could have a negative impact on the success of ICT school initiatives and the ICT school initiatives would struggle to be successful. ICT educator support services are therefore necessary to assist educators when using ICT resources during curriculum delivery. Complications set in when these support services are not adequate in assisting educators in the computer lab during curriculum delivery.

6.2.3.1. Primary support services
From the interviews, educator training on the use of the Khanya lab came across as a primary support service. The Khanya facilitator is the central figure in supporting schools and educators through the process of integrating the use of ICT resources into the school curriculum (Khanya, 2008a). The Khanya representative clearly highlighted that extensive training was provided to all educators and that the Khanya project did not believe in training only some of the educators. The school management was also trained.

The training was provided by the Khanya facilitators. These facilitators were ex-teachers who were specialists in their subject areas. The training provided to the educators was two-fold: the training covered the use of the ICT resources as well as the integration of the ICT resources into the classroom and into teaching. ICT training that prepares educators to effectively use ICT resources in education is an essential component in promoting the successful integration of ICT resources into the teaching curriculum (BECTA, 2001; Howell & Lundall, 2000; Miller et al., 2006).

As a complementary service the ICT School Trainer also indicated that they provided training in computer literacy to the educators at the school. The training covered the basics such as the use of Word, Excel, PowerPoint and the use of the Internet, but did not extend to include the integration of
ICT resources in curriculum delivery. The training sessions took place in the afternoons, once a week, over a period of six months (some educators said, it took nine months).

6.2.3.2. Secondary support services

The Khanya project and the ICT School Trainer also provided further secondary support services to educators using the Khanya lab. The Khanya representative indicated that the Khanya project provided additional educator support services such as discussion and support forums. These forums were important because they provided a common space for different schools and educators who were using the Khanya lab to come together and discuss problems and concerns related to the Khanya lab. In this way there was a mutual sharing of ideas and concerns and mutual assistance.

The Khanya representative also indicated that there was a mentorship programme where a principal with strong leadership skills assisted schools that were experiencing challenges with the implementation and use of the Khanya lab. Additional services provided by the Khanya project were electronic services such as blogs and CDs containing educator support information. The following quotation supports the finding:

...we also encourage teachers to get onto our blog ... teachers are actually encouraged to share their learning experiences and also to contribute to our learning material support [Khanya Rep]

The ICT School Trainer also supported schools by providing them with the services of a Lab Administrator. As a form of community service the ICT School Trainer recruited unemployed youths that had completed Matric. These youths were then trained as Lab Administrators. After the training the Lab Administrators were attached to Khanya schools for a period of six months. For the six months the Lab Administrators were free and the school did not pay for their services. The Lab Administrators assisted educators in the computer lab during the teaching. The Lab Administrators were there throughout the school day.

The feedback received by the ICT School Trainer was that the school and the educators at the school were appreciative of having a resource at the school to assist them in using the computer lab. An additional benefit of these resources was that they also provided computer literacy training to the educators. The Lab Administrators also assisted with technical glitches in the lab. These resources however were available to the school for only a limited period, which meant that the schools could not become dependent on these resources. Curriculum support was also noted as essential and, in the study by Miller et al. (2006), the educators highlighted that the WCED needed to be responsible for training educators on the expected changes in the curriculum when using ICTs in the classroom.
6.2.3.3. Challenge - Lack of effective educator support services

Van Wyk (2007) acknowledged that the support services provided by the Khanya project were not always successful. The low confidence levels shown by educators when using the ICT resources for the teaching also impacted on the success of the Khanya project in the school. This challenge was further complicated by the inability of educators to shift their mindset towards the use of ICT resources in education.

The lack of real support structures that are needed to do regular follow-up sessions with Khanya schools and educators on the use of the computer lab was noted as a challenge. Educator S1.T5 indicated that the lack of visible support structures at her school was evident. Luckily, the school had a LAN Administrator who was available to support the computer lab and the educators. Without the support of the LAN Administrator, the use of the Khanya lab would have been problematic. The respondent referred to an incident where a trainer came to the school to show the staff a programme that could be used in their teaching. The respondent raised a concern about the training session being (a once-off) and that there had been no follow-up sessions from the trainer to determine how much learning has actually taken place amongst the educators and whether the programme was actually being used by the educators. Without the support, educators did not feel confident to use the programme, which meant that the training session did not make much difference to them. The exercise was actually a waste of valuable resources. The following quotation confirms that the training sessions provided at School S1 were not as effective as they could have been:

...there was a gentleman here one day and he showed us some programme ... that we could use but that was once off and I felt that that wasn't good enough. To do that once, there is going to be no real solid foundation where teachers going to feel I'm going to use this. So in terms of their continuation there was no follow-ups, it was a once off thing [S1.T5]

The respondents noted the importance of having educators that were adequately trained in order to use the computer lab effectively. However, they stated that the training was not sufficient and left the educators ill-prepared to use the computer lab effectively. Educator S1.T5 highlighted a significant gap in the training provided to the educators. The training seemed to focus more on the technology side and missed the human component that interfaced with the technology. Technology was the passive component, while the use of the computer technology in the classroom was the dynamic component. The respondent felt that too little emphasis was placed on the actual use of technology in the classroom.

A suggestion from the respondent was that there might be a need for two trainers, one who covered the technical aspects of the computer technology and another one who covered the integration of computer technology in the classroom. From Khanya's perspective, the Khanya facilitator was the individual who covered both sessions of the training. What the respondent was highlighting was that
there might be a gap in the training being delivered to the schools and that there might be a need for a re-evaluation of the training approach used by the Khanya project.

Educator S2.T5 believed that the computer literacy levels of educators were a concern when dealing with learners who are computer literate. The effectiveness of the educator in the classroom was significantly compromised in this situation. The respondent added that there had been occasions when learners were prevented from coming to the computer lab, because educators were busy setting their examination papers. Previously, learners were able to access question papers as well as memo sheets. The respondent stressed that development was needed to empower the educators with basic computer knowledge to prevent these types of issues coming up in the future. The following quotations from respondents support this statement:

*Khanya did a good job with the basic training but it stopped there. We never went to the next level you see, and I feel that just like we go for other cluster meetings and for other curriculum delivery, teachers should be developed on IT level also, continuously. My own knowledge is outdated that’s why I applied now for LAN 2 training because I know I still don’t know enough. I need to know a little bit more to make optimal use of these facilities [S2.T5]*

*...from a teacher’s point of view there’s certain things that I need to know I need to be ahead of my game. I can’t know only as much as the kid knows, I can’t know minimum, so teach me NETHELP, tell me how to be in control of all of the computers at the same time I know there’s a function like that but I cannot do that on my own. So train teachers to use it as effectively as possible [S1.T5]*

*I feel teachers should be technically more empowered also that they understand the workings of the tool because that will enable them to use it better [S2.T5]*

Curriculum support in relation to the use of the ICT resources in curriculum delivery was perceived as a critical issue. According to a respondent, the lack of integration between the school curriculum and ICT use created confusion within the school, as the educators are not sure how to best use the ICT resource. Central to this discussion was the cost of the ICT investment and whether the school was benefiting. The respondents felt that the computer labs were not being used optimally. In order to use the computer labs more optimally, a respondent stated that the DoE should play a more prominent role in providing guidance to both schools and educators in the use of the computer lab in education. An effective way to provide this guidance to both the schools and educators would be by taking proactive steps to integrate the use of the computer lab into the school curriculum. The next quotation confirms that the use of the Khanya lab has not been successfully integrated into the school curriculum:
...your curriculum must specifically include the use of the lab, at the moment it’s not specifically included [S2.T5]

6.2.3.4. Lack of effective training

The data shows that there could have been problems in the effectiveness of the training provided. An example of a Mathematics educator in School S2 would illustrate the point. The following quotation highlighted the challenge she was facing in her use of ICTs in teaching:

"...the programmes that I do have on the computer they are okay except for the Mindset I can only use that one in front for Mindset. I don’t know what’s the problem with the other computers, they cannot go onto Mindset [S2.T3]."

The educator said that she had difficulties when trying to use the Mindset programme in teaching Mathematics. She could only run Mindset on the computers in the front of the class but could not get the programme to work on the computers used by the learners. Essentially, she could not effectively use the programme in the classroom. The educator was not sure whether the problem was technical in nature, or whether there was a gap in her training on how to use the programme.

The educator did not seem to be taking proactive steps in following up this issue with the LAN Administrator. During the interview with the LAN Administrator the issue with Mindset also came up and it was stated that the issue with Mindset was technical. The LAN Administrator said that one of the reasons Mindset was not working properly was the lack of technical training received by the technical staff who tried to implement the Mindset programme at the school. The LAN Administrator suggested that possible retraining of the staff was needed.

Educator S2.T3 seemed to not be willing to ask the LAN Administrator for assistance. A possible reason for not asking was that the educator did not want to feel inadequate, because she had been on educator training and could still not find a solution to the problem. This could also relate to a lack of effective communication and possibly a relationship issue amongst the educators using the Khanya lab. When asked whether the training that related specifically to the subject area was assisting the educator in the computer lab to effectively teach the subject, educator S2.T3 said:

"That’s the other thing, training. If I can be trained a little better ... I don’t know how to have Mindset in all the computers ... because I am still struggling with that [S2.T3]"

6.2.4. Learner preparation for ICT curriculum delivery

Learners also have an influence on the levels of motivation and job satisfaction that educators express (Chong et al., 2008). Learners with challenging academic problems negatively impact on the teaching environment. A significant investment is needed by educators in order to improve the academic performance of such learners. Success of ICT school initiatives would only be possible if both
educators and learners receive extensive support in the integration and use of the computer lab (Louw et al., 2008).

A gap that emerged from the discussions held with the educators was the lack of learner preparation for the use of ICT resources which seemed to have been an oversight when looking at the Khanya implementation process. The Khanya project did not prepare learners to use ICT resources.

The majority of learners in School S1 had no computers and no internet access at home. This meant that these learners were only introduced to computers for the first time at school. Additionally these learners had only been introduced to computers when they reached high school. The result was that the learners were therefore at a disadvantage when using computers in the classroom during curriculum delivery. Instead of focusing on the subject matter, the learners asked questions about the use of the computers. The quotation confirms the challenges experienced by an educator teaching in this situation:

... the how to questions actually takes up time you haven’t even gotten to the actual content that you want to look at, that I found to be a problem [S1.T5]

Educator S2.T1 suggested that learners expressed apathy vis-à-vis the use of the computer lab. Some of the learners came for research purposes, but, most of the learners used the computer lab for other activities such as downloading music. It was also noted that these learners would come to the computer lab when an educator was having a lesson in the computer lab. The School S2 LAN Administrator also agreed that the learners didn’t use the computer lab for research purposes and for this reason he felt that the computer lab was not being used optimally. The educator suggested that the staff at the school should play the role of influencing the learners to actively participate in the use of the computer lab specifically for educational purposes.

6.3. Responsibility
The following theme is associated with the Responsibility category: Taking charge of development.

6.3.1. Taking charge of development
The continued success of the Khanya project was dependant on educators taking charge of their own IT development. Some educators understood the importance of self-development. One case in point was educator S1.T3 who had been working in education for 29 years. Before the Khanya lab, this educator had had no exposure to ICT resources and was indifferent to the Khanya project. However, over time she became excited by the prospect of using computers in education. The educator highlighted her initial fear and anxiety about using the computer lab. After attending the basic computer literacy training, the educator understood the potential of the computer lab and the value it could add to her teaching.
The educator saw herself as a learner, constantly learning something new about the use of computers, applying this knowledge in her classroom when teaching Mathematics. The learning experience was exciting to the educator and in this way built her confidence. However, some educators were less willing to take on this development opportunity. According to the Khanya representative, not all educators were willing to change their mindset about the use of ICT resources in their classroom. The role of the educator was changing rapidly and this shift in mindset was important so that educators could meet these changes. The quotation confirms the challenges experienced in shifting the mindset of educators:

_Only for those who want it, but there are those who actually don’t! Some teachers who actually says NEE, LOS EK GAAN MAAR SO AAN, I’ve always done it this way, I will always do it that way and you will always have those teachers [Khanya Rep]_

6.3.2. Benefits - Educators taking charge of their development

Educator S1.T1 highlighted that previously computers had not been a necessity in teaching, but with the change in times, computers had become more relevant in the school and in the classroom. The educator understood this growing relevance of computer use in the classroom and therefore was eager to start the development of her ICT skills. The educator showed real enthusiasm and started training herself. To further her own development, the educator worked closely with the LAN Administrator at the school and also supported the rest of the staff with their ICT needs.

One of these requirements was to automate the generation of more than 1 000 learner reports. The educator seemed happy about this accomplishment. The educator added that she was now able to work at home and use the ICT resources with ease. This gave the educator fulfilment. Educator S2.T4 stated that the use of ICT resources made life easier. However, in order to reap the benefits of using the technology within the classroom, the educators needed to proactively take charge of their own development.

The LAN Administrator in School S2 said that he only started the development of his ICT skills after the Khanya project was implemented at the school. Before the Khanya lab he only knew the basics of computer use. Initially, the educators at the school were all afraid when the computers came to the school. However, the LAN Administrator knew the potential value of the computer lab in teaching and was eager to learn as much as possible about the computer lab and how to use the ICT resources. The LAN Administrator was conscious of keeping his ICT skills up-to-date and had applied for LAN 2 training to use the computer lab optimally. The quotation highlights the enthusiasm of the LAN Administrator for self-development:
...I was very forward in volunteering for every possible course that I could attend; that I’ve managed to improve my skills and that has sort of made the lab a very useful tool within my teaching [S2.T5]

6.3.3. Challenge – Shifting the mindset of educators

Overall, the educators in School S1 favoured the use of the computer lab. However, it was noted that some educators were not as proactive as they should have been in taking charge of their development. These educators were not comfortable with the use of computers in their classroom and would have preferred not to use the computers themselves. Educator S1.T4, for instance, indicated that he did not see the need to learn more about the ICT resources. This was of particular interest since educator S1.T4 was part of the school management. The lack of apparent enthusiasm in relation to ICT integration and usage could impact on the overall acceptance of ICT use within the school structure and could threaten the future success of the ICT investment within the school. The quotation expresses the lack of interest by the educator to continue along the path of self-development:

Some people find it that they can extend their knowledge...they will go on courses but for me No. I will limit myself. I need this for my subject [S1.T4]

One of the other factors mentioned as influencing the likelihood of changing the mindset towards ICTs was that of age. It was mentioned that older educators were less willing to use the computer lab in their teaching. According to S1.T2 and S1.T5, many of the educators at the school had been in education for many years and saw themselves as being part of the “typewriter age” – they were more comfortable with the typewriter than with the computer.

According to the respondents, the educators who had recently graduated from teacher training institutions are comfortable with the use of computers. The reason for this was that the use of computers had been part of the teacher’s training programme. The concern expressed by the educator was that the older generation of teachers still had a few years of teaching to go, some ten years others even as much as twenty years, yet were not computer literate or even had basic ICT skills. The issue was how the lack of computer literacy amongst the educators would impact on the use of the computer lab in teaching, and also what the impact would be on learner development.

6.4. Achievement

The following theme is associated with the Achievement category: Successes through the use of ICT.

6.4.1. Successes through the use of ICT

Educators needed to feel a sense of achievement when using the Khanya lab. This sense of achievement would act as encouragement for them to continue using ICT resources within their classroom. Successes in the classroom when using ICT resources would come from the proactive use
of these ICT resources in curriculum delivery. The Khanya representative stated that the proactive steps taken by educators toward empowering themselves was critical, and that this self-empowerment formed the foundation of future ICT successes in the classroom. The Khanya representative continued to add that in the past not many educators had had access to ICT resources, which meant that benefits such as the use of e-resources in their teaching was not an option available to them.

The introduction of the Khanya lab brought about a change to teaching and to educators who were willing to try the new teaching methods. Success in the use of these ICT resources in the classroom would give the educators a sense of achievement which would empower these educators. The Khanya representative cited an example of the schools in the Overberg area, where educators were able to share their knowledge about the development of lesson plans and the use of the technologies in the classroom. The outcome of these joint activities was that educators who previously did not have much of a presence in the classroom became more engaging when they incorporated the technology into their teaching. These educators now "have the flair for something technical". The educators now developed their own lesson plans and learning materials.

The linking up of schools in order to share knowledge amongst educators added to the sense of achievement felt by educators. The educators, as well as the learners, were able to experience the different ways in which the technology could be used within their classroom. The following quotation confirms how ICT resources had broaden the horizons of education:

...they do the video links and they do the emailing ... so the teacher feels that they imparting far more than just the basic lessons. The technology opens up so many more avenues, so many more horizons ... so it is a very empowering tool [Khanya Rep]

6.4.2. Benefits - Educators and their Achievements

Respondents had keenly highlighted their successes in the classroom when using ICT resources. Educators in School S1 noted that gaining knowledge was a motivation behind self-development. It was important for an educator to know more than the learners – this included having the knowledge to use ICT resources in the classroom. Not having these ICT skills had a negative impact on teaching. An educator added that a benefit was that the educator could teach the learners new and interesting things. The educator acknowledged that at first it was really a challenge to stand in front of the classroom and teach learners how to use the ICT resources in a subject area such as Mathematics. The challenge was made more significant by the fact that the educator was learning herself. The sense of achievement came when the educator saw learners starting to make sense of the ICT resources and how it fitted into the teaching curriculum. The benefits were also apparent when learners did better in their tests. These successes were a great sense of achievement for the educator. The ICT resources allowed the educator to go beyond the textbook and bring the outside world into the classroom, which made Mathematics more practical to the learners. As educator S1.T5 said, educators determine their
successes in the classroom by the excitement shown by their learners, and these successes kept this educator coming back to the computer lab.

Another educator indicated that the computer lab had given her a sense of empowerment. This educator has been in education for almost 30 years and considered herself a technophobe, but now was able to use the computer for school administration purposes as well as for teaching. The ICT School Trainer stated that the positive feedback that they get from educators highlighted that an educator who had successful interactions with the computer lab was more eager and motivated to use the computer lab. These successes could be as simple as the creation of a lesson planning template or adding graphics to a lesson in order to make it more interesting to the learners.

The ICT resources played a role in providing this visual representation to the learners. Access to a wide variety of e-resources and the teaching of learners kept this educator coming back to the computer lab. Learners needed to use the information to develop their own opinions and to appreciate knowledge. The computer lab was also used for revision purposes. Cami Maths was used by an educator to revise and consolidate the lessons taught in the classroom. The quotation confirms the benefits of using ICT resources in the classroom:

…it opens a whole new world for me. One is not governed by a particular textbook. One has access to the latest debates in the world, you can go onto blogs where you discuss a particular poem and you can actually enrich your students even more, because the more you are enlightened the more they will be enlightened…a simple site like Encarta, I’ve watched educator S2.T2 doing technology and it was amazing for the kids [S2.T5]

6.5. Summary
The literature indicated that the success of ICT school initiatives was dependent on the educators and learners in the school who were using the ICT resources during curriculum delivery. The foundation of this success was based on the level of support educators and learners received at the school in order to use and integrate the ICT resources into the teaching curriculum. It is the role of the school management to create a supportive school environment that encourages and prepares both educators and learners in the use of ICT resources in teaching. It is essential for educators to take on the responsibility of their own development. Educators who are successful in developing their own ICT skills would enhance the success rate of the ICT school initiative. In addition, educators who are successful in using the ICT resources during curriculum delivery feel a sense of achievement and the more successes these educators have with using ICT resources in the classroom, the greater the sense of achievement they experience. These educators gain a new set of ICT skills which opens up a world of opportunities in their career as educators.
7. Hygiene factors when using ICT resources in teaching

7.1. Introduction

Hygiene factors also referred to as extrinsic factors are those factors that are associated with the job environment. A worker will not perform optimally within his or her job as long as the hygiene factors are not satisfied. Hygiene factors work to decrease job dissatisfaction. Figure 7.1 is a schematic representation of the categories and themes identified during the data analysis of the transcribed interviews. These categories and themes are associated with the hygiene factors when using ICT resources in teaching. In this section, the findings associated with the hygiene factors will be discussed under the following categories: Company Policy and Administration, Factors Affecting Personal Life, Relationships and Working Conditions.

The Company Policy and Administration procedures are essentially a framework created by management to direct the operational activities of an organisation. In this study the school management was responsible for creating policies and administration procedures that enabled educators to effective use and to integrate the ICT resources in their teaching. The working conditions at school could also be referred to as the working environment in which educators perform their teaching duties. In this study the respondents have identified the limited number of available ICT resources as a factor that impacted on the working environment in which educators teach. A supportive school environment where educators are assisted by their colleagues would help build the motivational beliefs of these educators (Chong et al., 2008). Strong relationships amongst educators who use ICT resources at school would create a supportive network amongst the educators, increasing the opportunities for success when using ICT resources in curriculum delivery. Both educators and learners are impacted on personally by the use of ICT resources in education. Concerns were that more personal time was spent in supporting the computer lab and that some learners were not computer literate which meant that these learners struggled more when they used the ICT resources.
7.2. Company Policy and Administration

The following themes are associated with the Company Policy and Administration category:

- The role of School Leadership as the ICT Champion
- Management of Available Resources

7.2.1. The role of School Leadership as the ICT Champion

According to the findings, the role of school leadership as the ICT champion was important to the success of the ICT initiative within the school. Natarajan (2001) and Qiwen and Xiaofu (2006/2007) posit that the school management is responsible for creating a positive school climate which means that the school management also played a central role in championing the integration and use of ICT in teaching. The Khanya representative stated that the preparation of the school for the Khanya lab was essential and that school leadership needed to play an active role in this preparation. The school management needed to think about and plan for the sustainability of the computer lab. These plans should include identifying who at the school would support the computer lab. It was also important
for the school leadership to be clear on their ICT requirements and what the priorities are at the school. Having a clear purpose for the use of the Khanya lab would assist in the preparation of the lab.

Good leadership and a strong management team within the school were essential. Without good leadership and strong management, the ICT school initiative would struggle. This statement was confirmed by the Khanya representative who added that a principal who was a weak leader would impact on the success of the ICT school initiative. Weak educators also had an impact on the success rates of ICT school initiatives. Successes of ICT school initiatives were not confined to schools that had many resources. ICT school initiatives such as the Khanya project could be successful in schools with few resources, if the school had a good leader who was actively driving the use and integration of ICT resources in the school. The quotation supports the statement:

...you can put technology into the poorest of the poor township areas and it will work. There is a good leader who leads the process. You can put technology into the poshest area and you have a bad leader, poor leadership as far as the ICT is concerned it will fail [Khanya Rep]

7.2.1.1. Challenge – The lack of Vision, purpose and culture of ICT usage within schools

Some respondents agreed that the school needed to have a clear vision and purpose vis-a-vis the Khanya lab. It was also generally agreed that the school management was responsible for the creation of a vision and purpose of the Khanya lab. Without a clear vision and purpose, the Khanya lab would struggle to be a success within the school. According to educator S1.T3, one of the main reasons was that some educators did not have the confidence in their abilities to use the computer lab. She believed that this was a failure on the part of the school management who did not encourage and champion the use of the computer lab. School management should support these educators so that they could become more confident in incorporating the use of ICT resources in their teaching.

Educator S1.T2 also highlighted that the school lacked the culture of positive computer use and that this lack had a negative impact on the school. There was nobody on the staff who the educator could call upon for assistance. The fear that educators had about the use of the computer lab had created a culture of nonparticipation in the activities of the computer lab. The educator, who was also the LAN Administrator, stressed that, in general, educators should be given more time to come into the computer lab and practise their ICT skills. In this way their confidence in the use of the ICT resources would increase and the educators would be more willing to use the computer lab.

According to the ICT School Trainer, a positive sign that the Khanya lab stood a chance of being successful was when the school management actively started to manage the lab. This active management came in the form of using the school timetable to drive the use of the computer lab and actively managing the ICT training sessions of educators using the computer lab. The future
sustainability of the Khanya lab was also dependent on the school leadership playing an active role in the management of the computer lab.

An educator added that her perception was that the school management viewed the Khanya lab in isolation from the school i.e. not as part of the rest of the teaching activities. For instance, School S1 had no scheduled timetable for the computer lab. The school management spoke about this, but the suggestion was not implemented. This gave the educator the impression that the school management was not serious about the management of the Khanya lab. This educator also highlighted the lack of actual use of the computer lab by the school management in their subjects. This meant that the school management was not leading by example in the use of the computer lab in teaching as shown in the following quotation:

...they do not use it on a regular basis because all three of them have computers housed in their offices which mean they don’t actually need to get out. I can safely say that I’ve never actually seen any of them use it for educational purposes with regards to the subjects that they teach which again to me shows that there is no link between the computers here and what I am teaching [S1.T5]

Furthermore, the respondent highlighted that the computer lab was used more for school administration and not for its intended purpose of learner education. This comment highlighted that the school management might not have set a clear vision for the use of the computer lab which was problematic. Educator S2.T1 also highlighted in the interview that the vision and purpose of the lab at School S2 was not clearly communicated to both the educators and the learners. This resulted in educators not having a clear mandate on how to integrate the Khanya lab into their teaching, and learners not proactively pursuing the use of the ICT resources.

7.2.1.2. School management and its partnership with the DoE and the Khanya office
Some educators expressed concern over the lack of integration between the school management, the Khanya office and the DoE on the learning outcomes of using the Khanya lab. The educators were not always given a clear direction of the outcome of the school curriculum. The development of ICT skills should not be seen in isolation to the school curriculum. The school syllabus should incorporate the use of the ICT skills in teaching. The educator stated that the DoE “haven’t bridge the gap of where they want to take this”.

The lack of integration amongst the key stakeholders on the use of ICT resources in education resulted in educators using the Khanya lab with little consistency in their approaches. These differing approaches could impact on the ultimate effectiveness of the Khanya lab and could minimise the intended value of the ICT school initiative. Some of the uses included the use of the computer lab for
revision purposes, for typing exercises, for research purposes and for drawing graphs in Maths literacy. Educator S1.T4 could see little relevance in the computer lab.

7.2.2. Management of Available Resources
The school management played a pivotal role in the management of resources linked to the Khanya lab. The management of these ICT resources was complicated even further with the break in the relationship between the key stakeholders, i.e. the school management, DoE and the Khanya office. Educator S2.T2 stated that the implementation of the Khanya lab brought with it the accountability and the responsibility for the technology. The responsibility and accountability extended beyond the actual technology and included “other logistics that is not taken into consideration” when the Khanya lab was implemented at the school. The educator said that the school was not in a position to provide the computer lab with fulltime technical assistance.

Clear leadership and effective planning was therefore needed to make the computer lab a continued success within the school. The interviews further highlighted the following areas which impacted on the Khanya lab and over which the school management should play an influencing role to improve the operation of the Khanya lab: the “red tape” around the access and the use of the computer lab, the school finances, the school timetable and IT support staff.

7.2.2.1. The management and administration of the access to the computer lab [Red Tape]
One of the themes identified from the data was the perception held by educators that the Khanya office used an autocratic approach when it came to the management of the Khanya lab. This management approach taken by the Khanya office had a significantly negative impact on the relationship between the school and the Khanya project. The LAN Administrator at School S1 believed that the “red tape” associated with the use of the Khanya lab was a real challenge.

The use of the Khanya lab was controlled by the Khanya project and the Khanya facilitator was responsible for setting up the timetable around the use of the Khanya lab. The lack of ownership by the school in determining the use of the Khanya lab was a significant challenge to the educator. This quotation supports the statements made by the educator:

...the rules attached to Khanya are too strict. There's no freedom whatsoever and if they say the Maths people can use it then the Maths people can use it [S1.T2]

The LAN Administrator indicated that he had been told by his counterparts in other schools that they had similar challenges with the management and ownership of the Khanya lab. An example of the impact of the rules on the operations was when School S1 created its own timetable to include the use of the computer lab. This was an attempt by the school to give most of their learners’ access to the computer lab. The idea was to give the learners at least one lesson a week to expose them to the use of
computers and to familiarise them with Word, Excel and other software packages. The Khanya project rejected the proposal. The Khanya facilitator indicated that the use of the computer lab was only for FET learners and more specifically FET learners doing English and Mathematics i.e. the rest of the school did not have access to the computer lab during the teaching day. The other learners (those who were not FET Mathematics or FET English) were accommodated before school, during intervals and after school. Educator S1.T2 also gave an example of a rule implemented by the Khanya project and the negative impact this rule had on the school:

...last year the FET were allowed to use. This year I had a notice on the board there NO FET this year GET only, so the Grade 8’s and 9’s is supposed to use this room from this year [S1.T2]

The change meant that the Grades 8s and 9s had access to the computer lab at the expense of the Grades 10, 11 and 12. The educator indicated that the learners in Grades 10, 11 and 12 constantly questioned and nagged him about having, access to the computer lab for their research projects. The educator could do little and could only allow the learners into the computer before school, during intervals and after school. However, the time after school was not an option for most learners, since they needed to leave school early because they stayed far away from the school.

Educator S1.T3 who taught at the FET level indicated that this accessibility rule had a negative impact on her. According to this rule her class was not allowed access to the computer lab. The impact of the rule was that the computer room did not benefit all learners, even where there was some spare capacity. This rule would ultimately mean a waste of school resources. The educator was, however, adamant and still took her learners into the computer lab despite the new rule that prohibited her access.

Some educators said that the computer lab was not becoming part of mainstream education but rather it was "exclusive" for certain learners. Exclusivity of the computer lab was an issue. Educators S1.T4 and S2.T5 confirmed that in their respective schools the computer lab was meant more for Mathematics and English and that this was part of the frustration, since the other subject areas were not officially given access to the computer lab. Learners were also frustrated since they were not given the chance to do the research needed for their assignments and reports. The school management needed to take the lead on this issue and design a plan to address this issue. Suggestions from educators were to have a computer literacy period on the timetable.

7.2.2.2. The management and administration of the school finances

Miller et al. (2006) indicated that a lack of financial resources was a challenge for schools in need of additional ICT resources. To ensure the future success of ICT school initiatives, schools would need sufficient financial support in order to cover the operational costs of the computer lab (Howell &
Lundall, 2000). The financial resources of a school played a significant role in influencing the capabilities of the school management to manage and administer the Khanya lab. The Khanya representative stressed that the "financial sustainability" of the Khanya lab was important and that the school management needed to put in place a plan that would work towards achieving and maintaining the financial sustainability of the Khanya lab. Both schools had limited financial resources and this significantly limited their ability to acquire additional ICT resources and to employ a fulltime ICT lab Administrator. Limited finances at the school negatively impacted on the progress of the ICT facilities within the school.

Due to the limited capacity of the Khanya lab, School S1 LAN Administrator requested that the principal consider putting touch screens in the classrooms. This would address the capacity constraints of the computer lab as well as give those learners, who have not been allowed into the computer lab, access to ICT resources. The educator wanted to "take the IT to the classrooms". According to the LAN Administrator, this would make his work easier since the touch screens would only need cabling running to each classroom, and an internet connection. The educator would simply need to ensure that the system was up and running.

The response of the principal was that the school did not have the financial resources needed to implement touch screen technology at the school. Educator S2.T2, who was the Vice-Principal at School S2, also indicated that the school was not able to staff the computer lab with fulltime technical lab assistance due to financial constraints. Educator S1.T1 indicated that there was an intention from management to address the constraints concerning the number of physical ICT resources available in the school. The educator, however, noted that the financial constraints would hinder the school from achieving this goal.

7.2.2.3. The management and administration of the school timetable

Miller et al. (2006) stated that the school timetable could be used as a tool to manage the access to the ICT resources. However, having a school timetable that adequately caters for all subject areas within the school was a challenge, and this challenge was made more complicated when the school needed to look at scheduling additional time for the use of the computer lab. The Khanya representative agreed that schools with many learners would struggle to find enough time during the school week to schedule lessons in the computer lab for all the learners.

This issue was further complicated as learners would need more than an hour a week in the computer lab. An hour a week was not enough for learners to consolidate their learning and do sufficient research for their projects. Wenglinsky (1998) added that giving educators and learners adequate access to the computers would help in making the ICT school initiative a success. It therefore became clear that more ICT resources were needed. A suggestion from the Khanya representative was that schools should invest in interactive whiteboards.
As an alternative to acquiring additional ICTs, which most schools would not be able to afford due to financial constraints, some educators suggested up-skilling the learners. A computer literacy subject would help the learners familiarise themselves with the use of computers, as well as the educational software used in the computer lab. If the learners were familiar with the workings of the computer lab, the educators could focus solely on teaching their subject. The computer literacy subject would also allow the rest of the school access to the computer lab to do research and project work. This suggestion brought about its own challenges. For instance, educator S1.T4 noted that it would be difficult to add a computer literacy period to the current school timetable because the school syllabus was overloaded and the school timetable needed to accommodate the school curriculum.

Educator S1.T2 was proactive in creating a timetable for the use of the computer lab. However, this attempt at creating a structure for the use of the computer lab was not successful. There was little cooperation from the other educators and the school management was not proactive in driving the use of the timetable. The timetable was in the staff room and any educator could book a timeslot in the computer lab. The educators were reluctant to use the computer lab and the respondent said that only “my name appeared on that list basically every day”.

The lack of communication and planning by the school management around the use of the timetable became clearer when looking at a statement made by Educator S1.T5, who came with the same proposition of using a timetable to manage the computer lab which had already been suggested by Educator S1.T2. The school management did not take this suggestion further - they seemed to lack the vision and the drive to integrate the use of the computer lab into the mainstream of the school. The quotation confirms the statement expressed by the educator:

I have spoken to the principal and I’ve actually asked him to give us a timetable ... then you’d slot in when you would like to use the lab ... management said yes it is a good thing to look into, never happened ... [S1.T5]

The response from educator S1.T5 further highlighted that there was no real integration between the Khanya lab and the formal curriculum that was taught at the school. This lack of integration would have had a negative impact on the success rate of the computer lab and strong leadership was needed to find a way to bring the computer lab into the mainstream of the school. If the leadership of the school was not committed to bringing the computer lab into the mainstream of the school, the computer lab would struggle to reach its full potential and would probably fail. The quotation from educator S2.T5 on the lack of integration between the curriculum and the use of the computer lab further confirmed the statement made by educator S1.T5:

...your curriculum must specifically include the use of the lab, at the moment it’s not specifically included ...but I feel that the dept can do that ...actually tell teachers that these are
At the time of my research, educators were using their teaching time which was set aside for syllabus work to use the computer lab. Educator S1.T4 was not in favour of this. At that time, the timetable had too many Mathematics periods. The respondent suggested that some of the Mathematics periods could be converted into computer literacy periods. Another suggestion was that there were two guidance periods on the timetable and that one could be used for computer literacy.

7.2.2.4. The management and administration of the IT school support personnel

The school management was responsible for providing adequate IT support to the educators and learners who use the computer lab. The more people capable of supervising the ICT resources, easier would be the access to the computer labs for educators and learners (Miller et al., 2006). Essentially the school management had two options: to train an educator on the staff to become a LAN Administrator or to add an IT specialist to the school staff. Due to the financial constraints in both schools, the only option available to the schools was to train the educators.

Most educators in School S1 expressed the need to have an IT specialist at the school to look after the computer lab. Educator S1.T1 indicated that they were fairly comfortable with the technology at the school and did their best with the ICT skills that they had. However, the respondent added that they did not have an IT qualification and that having an IT specialist at the school would help.

Some educators felt that the problem was that the LAN Administrator was not working fulltime in the lab. This made the LAN Administrator unable to support the educators in his full capacity. The result was that educators sometimes had to struggle through a lesson in the computer lab on their own. The quotation by educator S1.T5 confirmed the statements made by educator S1.T1 and S1.T3:

...there are so many issues when it comes to computers. There's so many problems that could occur that needs to be sorted out and if there is a problem whether it's admin or learning or teaching there's nothing you can do if the person isn't there ... and then your computer is rendered useless for that day or for the next two or three days ... I would definitely suggest someone being here from time to time.[S1.T5]

The School S2 LAN Administrator held a different view regarding the provision of IT support to the computer lab. Essentially, he would prefer the ICT skills to be spread amongst the educators, which would address the issue of up-skilling the educators and also add to the personal development of these educators. The benefit of having more educators with LAN training at the school would mean that the technical support of the computer lab would then be shared amongst the educators and not be the focus of one particular educator. The quotation confirms the importance of up-skilling educators:
I don’t like the idea of one or two people at the school knowing everything. It creates problems if one, or two people leave that school, then you have to retrain everybody from the start. I am of the opinion that more teachers should be empowered with the finer workings of the lab [S2.T5]

7.3. Factors affecting Personal Life

The two parties that are impacted on by the Khanya lab are the educators and the learners; the Khanya lab does impact them on a personal level. The following themes are associated with the Factors affecting Personal life category:

- Personal impact on Educators
- Personal impact on Learners

According to Hayward (2002), the level of morale for an educator is partly affected by the level of morale of the learner.

7.3.1. Personal impact on Educators

The “red tape” surrounding the use of the computer lab was a challenge. Since the Khanya lab was for specific subjects such as Mathematics and English, not all learners had access to the computer lab. Most learners, however, still needed to use the ICT resources for research and project work. The learners could access the computer lab only before school, during intervals and after school. This required the LAN Administrator to sacrifice his personal time to keep the computer lab open for learners as well as educators who needed to use the computer lab.

7.3.2. Personal impact on Learners

In both schools the majority of the learners stayed far from the school and this had an impact on their computer usage. Most learners could not utilise the labs after hours, therefore it was difficult for educators to organise extra lessons after hours. This meant that the labs were underutilised. Educator S1.T4 suggested that the computer lab was used “one third of the day and two thirds is just like a white elephant”.

Furthermore, the economic background of the learners meant that most of them had no computers at home and probably had used computers for the first time at the school. This quotation from educator S2.T4 confirms the negative impact that a lack of resources had on learners and their educational prospects:

[Deep Exhale] …I have got such mixed emotions with this ... one is that the lab can only be successful if people have computers at their houses... I don’t foresee children at this school in the near future being able to come to a point where they can say now each one is going to have
a computer at their home or some form of computer at home. Maybe one day when they go to work, they would buy a computer for themselves [S2.T4]

7.4. Working Conditions

The following themes are associated with the Working Conditions category:

- The availability of the computer lab and support structures
- Capacity of the Computer Lab

7.4.1. The availability of the computer lab and support structures

The success of ICT school initiatives was dependent on having an effective support structure in place to assist schools with technical problems within the shortest possible time. The Khanya representative also highlighted that, in schools where educators have limited technical ability, technical problems occurring in these schools would not be resolved by the staff. This put the ICT school initiatives at risk of being a failure since the educators are "going to lock it up, put it back into a cupboard and never use it again that has been the case". For this reason, technical support structures are essential in helping schools use ICTs in curriculum delivery. The technical support would deal with technical issues so that their impact on the schools is minimal (Miller et al., 2006). Part of the Khanya support strategy is to train at least two educators per school as LAN Administrators. The LAN Administrators "become the first line of defence" when there are technical problems in the Khanya lab.

The Khanya representative stated that the ultimate goal was to have schools that act independently with regard to the technical support of the Khanya lab. For this reason, schools were encouraged to obtain the services of a private service provider who would be responsible for looking after the technical requirements of the computer lab. Schools that are technically self-sufficient are essential and this quotation supports this statement:

...can't depend on the government ... if a server goes down for a week! It is not impossible; it can go down for a month. That means that the entire system is thrown out ... the curriculum sustainability breaks down, because who's going to go into a lab after a month [Khanya Rep]

Due to financial constraints, the view held by the Khanya representative that schools needed to budget for the services of an IT specialist to assist the school with technical problems was somewhat unrealistic. Both schools had indicated that they had experienced technical problems which resulted in the computer lab not being available to the educators and learners. At times the downtime lasted for months, which impacted on both the technical and curriculum sustainability of the Khanya project at the schools.

The ICT School Trainer indicated that his lab assistants encouraged educators and the ICT committee to take ownership of their technical problems. Technical problems should be logged with Khanya and
be monitored until the problem gets resolved. The ICT School Trainer indicated from past experience that the lack of taking ownership for the logging, following up and the resolving of technical problems in the computer lab, was a challenge. This assistance provided by the lab assistants was an attempt at “building the culture in the school of following up and not just leaving things so that they do go into disarray”.

7.4.1.1. Challenge - Educators express concern about the availability of the computer lab

Van Wyk (2007) acknowledged that the ability of the Khanya office to address the technical problems in the computer lab was restricted, due to the limited technical resources available to the Khanya project. This limitation significantly impacted on the availability of the computer lab. Educator S1.T1 highlighted that she could not take her learners to the computer lab because the computer lab was technically unavailable to the educators and learners. The educator also added that she wasn’t able to get her learners to the computer lab yet in this year. This was quite surprising because the interview took place close to the end of the first term, which meant that the educator had not used the computer lab for a period of two to three months. The educator indicated that the computer lab had battery problems. Educator S1.T3 confirmed the views expressed by educator S1.T1, saying:

"...very often the lab is out of bounds because things have gone wrong and they just cannot manage the lab or sustain it properly because technically things go ... that I find very frustrating [S1.T3]

The LAN Administrator of School S1 expressed concerns over the level of technical support the school was receiving. According to this respondent, the response from the Khanya technical support team was not good. After logging a call with the Khanya technical support desk, the school had to wait for a response from the technical support team. This waiting was a challenge for the school which was made clear when the educator said “they will decide one day when they going to come out...whether they going to come today, tomorrow or next year”.

The technical problems experienced at the school were further compounded by having a faulty Uninterrupted Power Supply (UPS) which the technical support team said would only be back at the school within three to four weeks. The LAN Administrator was forced to run the computer lab without a UPS which placed the system at risk; however this was the only option available at the time. Ultimately the impact of the technical problems on the computer lab could be reduced if the response to fixing the technical problems happened promptly (Miller et al., 2006).

The problem with the Mindset system in School S2 was an example of technical support that had failed the school. According to the LAN Administrator, the system had a problem – the problem was not unique to School S2 but also affected other schools. The educator believed that the Khanya project was failing the school vis-a-vis supporting Mindset. The Khanya project placed most of its focus on
the Khanya lab and made sure that the computers were working, but with only a limited focus on the Mindset system. The benefit with Mindset was that the educator could use the audio-visual projector in the classroom. The computer workstations were not needed so all learners in the classroom could participate in the lesson. The educator was not limited by the number of computer workstations in the computer lab. However these benefits of Mindset did not materialise due to the technical faults experienced by educators when they used the system.

Another area of concern, raised by educator S2.T5, was the virus control programmes on the machines. The learners sometimes downloaded documents that were infected with viruses, which then resulted in problems with the school computers. The availability of the computer lab was then impacted on until the virus infection was dealt with. Yet another area of concern was when the internet transmitter went down and resulted in the school not having internet access. The educators were scared to resolve the problem "because it’s now holy ground, this is Khanya’s server area... you don’t mess around here" so the school had to wait until a Khanya support person was sent out to the school to fix the problem.

7.4.1.2. Lack of technical support – An example

Empowering educators would benefit both the Khanya support centre as well as the school. This example given by educator S2.T5 was a clear indication of how a technical problem that should have taken a few days, actually took a few months to fix. Educator S2.T5 remembered a time when the port switch was broken and the result of the technical breakdown was that the computer lab stood still for two to three months before the issue was resolved. According to the educator, the problem was easy to fix by simply unplugging the port switch, waiting a few days for the new switch to be delivered and then plugging in the new switch again. This exercise would have taken a few days to be resolved. Instead the school had to wait a few months for assistance from the Khanya lab. The quotation of the educator confirms this statement:

...we couldn’t use it...from the server everything goes to that port switch and from that port switch it’s connected to each and every computer here, so if that thing blows then there’s nothing happening, you can basically only use these two computers here in front, but I mean it was just an issue of unplug, taking it out and plugging it in again [S2.T5]

The educator also had the viewpoint that the service provided by the Khanya support staff was not as supportive as it should have been. The educator indicated that the Khanya support staff would sometimes “get agitated” when the school asked them for assistance. Technical empowerment of the educators at the school would have gone a long way to reduce the burden on the Khanya support staff. The quotation of the educator confirms this statement:
...they get agitated...some of these support guys get agitated because it was a small problem, but on the other hand they don't empower you [S2.T5]

7.4.2. Capacity of the computer lab

The lack of educational resources was one of the factors identified by educators that negatively affected educator morale (Hayward, 2002). The perception held by educators of their ability to use the ICT resources in teaching was also influenced by the lack of ICT resources. These educators expressed the need to have more ICT resources in the school (Miller et al., 2006). Capacity issues relating to the Khanya lab seemed to be a major problem and it was highlighted by most of the respondents. The educators from both schools indicated that the capacity of their respective computer rooms was not enough to support the entire learner population. The educators highlighted that their class size, on average, was above 40 learners in a classroom. The Khanya lab had 25 computers which was not enough to support classes with an average of 40 learners.

The capacity problem was exacerbated by the fact that, due to the technical difficulties in the computer lab, not all the computers were working. This was the case at the time of the interviews: in School S1 one of the computers was not working and in School S2 two computers were not working. Infrastructure limitations such as insufficient server space and limited bandwidth also had a negative impact on the effectiveness of the computer lab. Educator S2.T5 indicated that the processing speed of the system was negatively impacted when all the learners went onto the internet to search and retrieve documents. The problem was that "it takes too much space up".

To accommodate the limited capacity of the Khanya lab the educators had to be creative. Two or more learners had to share a computer, or alternatively, the class had to be split into two groups with one group at a time having access to the computer lab. The Khanya representative agreed that the capacity issue of the Khanya lab was a major limiting factor that negatively impacted the effectiveness of the computer lab. The following quotation confirms this statement:

...if you got 2 000 kids in a school and you have 25 or 30 computers or 40 computers, it is absolutely no good. You need far more or in fact you need technology in the classroom, so that you can have an impact [Khanya Rep]

To overcome this limitation, the educator spent his time going to all the computer sites and gathering all the relevant information for the lesson. He then consolidated the information into a lesson for the learners to have easy access to. The benefit of this exercise was that the educator did not need to struggle through a lesson where the system was slow because all the learners were trying to access the internet at the same time. The disadvantage of this exercise was that these learners were not getting enough practice sessions on how to effectively use the internet to search for information related to a particular subject area.
The adjustments made by the educators to accommodate the limited capacity had their own challenges. Sharing computers amongst the learners made it difficult for the educator to teach all the learners at the same time. The reason for this was that one learner would be using the computer and the other learners would sit back and not actively participate in the lesson. The learners who were waiting for their turn would often become frustrated during this process. The sharing of computers amongst learners also led to the issue of who would take control operating the computers. The educators indicated that the management of the sharing within the computer lab was challenging, since the educator needed to manage the expectations of the learners and, at the same time, be fair and try to accommodate all the learners in the computer lab.

One educator stated that the process was “unfair to some of the learners because they going to stand around because there is no computer for them”. Splitting the learners into two groups meant that the educator could only supervise the one group in the computer lab while the other group was left unsupervised in the classroom. This situation was not the best way to use the educational resources available within the school.

The next quotation expresses the frustration experienced by an educator when having to deal with the capacity constraints of the Khanya lab:

"let me just be honest, with Grade 12's I have 17 learners, that's the only class that I enjoy when I am in the lab [giggle], because all of them have computers, but for Grade eleven, ten, eight and nine I don't even think about that I only come because I have to reason being, if you have 45 learners and only 25 are benefiting, actually 25 or less, because we have 25 computers in there it's not useful ... My biggest challenge is space [S2.T3]"

7.5. Relationships

The following theme is associated with the Relationships category: Building relationships amongst ICT users.

A good relationship between educators using ICT resources for curriculum delivery was one of the prerequisites for the sharing of knowledge amongst the educators. Schools where the educators had formed an integrated support structure and where they could share what they had learnt amongst one another, had a high chance of being successful. The Khanya representative agreed that the building of successful relationships amongst educators using ICT resources within the school for curriculum delivery was important.
Educators with a good supportive working relationship amongst themselves were more likely to help each other out by sharing their knowledge with one another. These relationships extended beyond the school and over the borders of South Africa. Through the Khanya project, educators in South Africa were able to interact with schools across the world and were able to share their knowledge with one another. Through the use of interactive whiteboards and video webcam technology, the educator was able to link up with schools across the world and share their learning experiences. Educators in School S1, however, stated that there was no real interaction between the educators using ICT resources within the school; this issue was exacerbated by the fact that there seemed to be no forum for educators to discuss and share challenges, frustrations and their computer knowledge. The strain on the relationships was complicated further by the lack of willingness to share between the educators.

The full teaching schedule was highlighted as one of the obstacles that prevented educators from getting together and discussing issues relating to the use of the computer lab that they had. Educators were "occupied in their classes". The lack of willingness to share knowledge amongst the educators was also highlighted as a hindrance. An educator stated that "there's a lot of selfishness" especially from those educators who had been on advanced computer training. The educators with the new skills did not come back to the school with the intention of empowering the rest of the educating staff because "it is so difficult to learn from them". Educator S1.T5 added that relationships and support amongst educators happened "on a very informal basis", with no real structure and purpose. Educators would, in passing, ask for assistance, and would either get help or not. The contact with the LAN Administrator also happened on an informal basis with no real formal supportive structure.

The following quotation from the School S1 LAN Administrator confirms that although the educator was prepared to assist in the computer lab there was a lack of really supportive relationships amongst the educators. The LAN Administrator was asked whether the other educators were experiencing any frustrations or challenges when using the computer lab and the reply was:

Well, I wouldn't know I haven't spoken to them about their frustrations and I am sure they have enough...I just felt I can cope and I can deal with my thing. If the guys don't want to share their frustrations I'm not going to play dentist and extract it from them, so I just thought to myself no let there just be peace. The moment you start treading in the dangerous areas, might lead to conflict or confrontation, but if they needed my help I always assist them [S1.T2]

Relationship issues in School S2 were less visible than in School S1. However, the interview with educator S2.T3 highlighted that the relationships amongst the educators using the computer lab might not be as accommodating as the relationships could possibly be. Educator S2.T3 had a recurring problem with Mindset when she used the computer lab for teaching. The LAN Administrator was in a position to help, however, the educator was not proactive in approaching the LAN Administrator for
assistance. The educator might have thought that asking for help would make the educator look inadequate.

7.6. Summary

The literature and the respondents in the study highlighted that an effective school leadership was essential to champion the integration and use of the ICT resources in the school, as well as to effectively manage and administer the maintenance and use of the ICT resources in the school. In both schools it seemed as if the management of the available ICT resources posed a significant challenge to the school management. The respondents highlighted that technical problems in the computer labs had significantly impacted on their use of the Khanya lab. These concerns were made even more significant when the technical problems that affected the computer labs lasted for months at a time. A computer lab where all the computers are operational and available to educators and learners to use in teaching was therefore essential for the success of the Khanya project.

The respondents also highlighted that the number of computers in the school was not enough to support the number of learners attending the school. The result was that learners needed to either share the computers, or classes were split in an attempt to accommodate the large number of learners. For this reason, many of the respondents agreed that the lack of available capacity in the Khanya lab had a negative impact on teaching. The financial constraints identified at both schools had a significant impact on the ability of the school management to address the operational issues impacting on the running of the computer lab. For this reason the management of the school’s financial resources played a central role in addressing the issues relating to the availability and the capacity of the Khanya lab. The respondents stated that there was a lack of supportive relationships amongst the educators using the Khanya lab. This lack of supportive relationships made it difficult for educators to share their knowledge amongst one another on the use of the computer lab. The lack of supportive relationships also made it difficult for struggling educators to ask for help with difficulties they experienced in the computer lab.
8. The relationships between categories

8.1 Introduction

An analysis of the categories discussed in the previous two chapters shows that the categories are not independent of each other. There are a number of relationships between the categories. This chapter discusses the main relationships between the categories. Figure 8.1 is a schematic representation of the relationships amongst the categories; the arrows indicate the direction of influence between the different categories. A proactive focus on these relationships to develop them into positive relationships between the categories will benefit all the key stakeholders - the educators, the learners, the school, the Khanya Office and the DoE.

![Diagram showing relationships between categories](image)

Figure 8.1: The relationships amongst the categories identified during data analysis

8.2 The influence of Company Policy and Administration

The school policies and administration procedures had an extensive impact on the school. ICT school initiatives would only stand a chance of succeeding when you have educators that are eager to use these ICT resources in their classroom. The role of school management is to encourage educators and learners to become eager about using ICT resources. Through having effective policies and administration procedures within the school, the school management is able to create a school environment that encourages the use of ICT resources by educators and learners. The Company Policy and Administration category impacts on the following categories: the Work Itself category, the Working Conditions category, the Relationships category and Responsibility category.

8.2.1 The impact of Company Policy and Administration on Work Itself

The Company Policy and Administration category impacts on the Work Itself category. It is essential to have effective support structures in place at the school to support both educators and learners in the use of ICT resources. However, from the interviews it was clear that these support structures are not as effective as they should be in assisting both educators and learners. Educators were not adequately supported during the ICT curriculum integration process and this was highlighted by the lack of
training, the lack of technical support, the lack of follow-up services from the Khanya office and the DoE and the lack of integration between the IT use in the school and the school curriculum.

Learners needed to possess the necessary ICT skills required to fully utilise the ICT resources. Most learners did not possess the necessary ICT skills required to use the ICT resources. These learners negatively impacted on teaching since the educators needed to assist the learners first with the use of the ICT resources - this then reduced the actual time spent by the educator on the actual subject area.

Through establishing effective school policies and administrative procedures, the school management would be able to provide the support structures needed by educators and learners to make effective use of the ICT resources. These policies and administrative procedures should address the lack of effective educator and learner training, the lack of technical support, the lack of integration between ICT use and the school curriculum and the addition of a computer literacy subject to the school timetable would assist in preparing learners for an ICT curriculum. It would also be essential that the school management form strong relationships with the Khanya office and the DoE in order to facilitate the process of creating these support structures.

8.2.2. The impact of Company Policy and Administration on Working Conditions

The Company Policy and Administration category impacts on the Working Conditions category. It is important to consider the working conditions of educators who are using the Khanya lab when determining the factors that impact on the use of the computer lab by the educators at the school. Two areas of concern for the two schools were the capacity of the computer lab and the availability of the computer lab to educators and learners for teaching.

8.2.2.1. The capacity of the computer lab and its impact on the working conditions of educators

For the computer lab to run smoothly, it was essential to have enough computers available in the Khanya lab to accommodate the number of learners within the classroom. However, this was not the case. The capacity limitations led to two or three learners sharing computers. This negatively impacted on the teaching, and reduced the potential value that the Khanya lab could add to the lives of educators as well as the learners.

Acquiring more computers was not an easy option for the school management, since both schools had financial constraints. However, creative policy making and keeping a tight control over the administration of the school’s financial resources could help start the process of saving money towards acquiring additional ICT resources. In addition, the school management needed to proactively engage with the Khanya office and the DoE to seek possibilities of additional financial assistance towards buying the additional ICT resources. Creative negotiation and constructive planning were needed to get the financial help from the Khanya office and the DoE.
8.2.2.2. The availability of the computer lab and its impact on the working conditions of educators

Technical faults render the computer lab inaccessible to both educators and learners. The Khanya office is responsible for the technical support to the computer lab in the schools. However, it seemed that Khanya did not have enough human resources to provide the required support.

To improve the working relationship between the school and the Khanya office, the school management needs to actively engage with the Khanya officials over the lack of effective technical support provided to the schools. The school management is responsible for managing this relationship. The educators have also indicated that they need additional training to technically administer the computer lab by themselves. This is a perfect opportunity for the school management to implement the additional technical training requested by the educators with the Khanya office. The additional technical training would empower the educators and result in the school becoming technically self-sufficient. The availability of the computer lab could also be improved by reducing the "red tape" associated with the computer labs as well as administrating changes to the school timetable. This would increase the time the computer lab is accessible to the educators and learners.

8.2.3. The impact of Company Policy and Administration on Relationships

The Company Policy and Administration category impacts on the Relationships category. Healthy relationships amongst the educators who are using ICT resources in the school would allow the educators to learn from each other. This would create a support structure for the educators and in so doing lead to the growth and empowerment of these educators. Having educators who are empowered and are confident when using ICT resources in teaching will increase the chances of the Khanya lab ultimately succeeding in adding value to the school and teaching. The challenge to this relationship is that there seems to be no forum in the school that can be used by the educators to share their knowledge. This challenge is further complicated as there are no real constructive relationships amongst the educators and, if sharing actually does take place between the educators, it happens on an informal basis.

A school management that champions the use of the computer lab in teaching is likely to have a positive impact on the relationships amongst educators. This would require the school management to have a clear policy on the vision and the purpose of the computer lab in the school and to establish a formal IT committee to deal with educator and learner needs.

8.2.4. The impact of Company Policy and Administration on Responsibility

The Company Policy and Administration category impacts on the Responsibility category. Educators who are willing to take on the responsibility of self-development to improve their ICT skills are important for the success of the Khanya project. In order to inspire the educators in a school towards the use and integration of the ICTs into their teaching, there is a need for an empowering principal who would champion the value that the computer lab can add to teaching. The school management
and the ICT committee would play an important role in changing the educators’ mindset to think of the computer lab as a positive addition to the school. To enable this mindset shift, the school needs policies and administrative procedures that encourage and facilitate educators to take on the responsibility of self-development.

8.3. The influence of Responsibility
The Responsibility category impacts on the Achievement category. Building up positive experiences is one of the four factors that impacts on self-efficacy. The more successful one is at performing particular tasks, leads to an increase in the individual’s self-efficacy beliefs. The increase in self-efficacy also means an increase in the confidence levels of an individual which would encourage the individual to continue with the behaviour (Bandura, 1986; 1997). Educators, who are proactive in taking up the responsibility to develop ICT skills for curriculum delivery, are likely to have more successes when using the ICT resources. Successes in the computer lab would build up the confidence levels of the educators which would lead to more proactive use of the computer lab by the educators during teaching. Educators can only have the successes in the computer lab if they are willing to take on the responsibility of their self-development. Not all educators were willing to take on the responsibility of their self-development which then had a negative impact on achieving the teaching successes in the computer lab. As noted in the previous sections, the school administration has an impact on the level of responsibility.

8.4. The influence of Work Itself
The Work Itself category impacts on the following categories: the Achievement category and the Factors Affecting Personal Life category.

8.4.1. The impact of Work Itself on Factors Affecting Personal Life of the educator
The use of ICT resources in teaching impacts on the personal life of the educator. The “red tape” surrounding the access to as well as the use of the computer lab impacted on the educators personally. To compensate for the lack of access to the computer lab, the LAN Administrator needed to sacrifice personal time in order to keep the computer lab open for the learners. These time slots were before school, during intervals and after school.

8.4.2. The impact of Work Itself on Achievement
Educators who are successful in using and integrating the computer lab into their curriculum delivery would feel a sense of achievement. This sense of achievement is important since these educators would feel empowered and their self-efficacy would grow in terms of them using the computer lab for curriculum delivery.
Educators identified successes through the use of ICT resources in teaching as:

- gaining and sharing of knowledge and the broadening of one's horizon through the use of electronic resources such as the Learn Channel and software such as Encarta and the Internet
- reducing time-consuming manual teaching activities e.g. drawing graphs by hand compared to using Excel to draw the same graphs
- allowing for interactive classes instead of the traditional talk and chalk method of teaching
- addressing low levels of learner literacy and numeracy, and empowering educators and learners with new ICT skills

Both educators and learners need to be supported to enable them to achieve successes through the use of ICT resources in education. This support should also help educators and learners to overcome the factors associated with the use of ICT resources which impacted on them personally. The following support services were essential to assist educators when using ICT resources in curriculum delivery:

- basic and advance ICT educator training
- technical support for the computer lab
- the integration of the ICT resources into the school curriculum
- regular follow-up sessions from Khanya and the DoE which would also improve their visibility within the school
- school management having a clear vision and purpose for the integration and use of the computer lab at the school
- the establishment of an ICT school committee to drive the management and administration of these support services

Learners who lacked the necessary ICT skills to use the ICT resources were a major concern. The educators needed to spend time helping the learners develop the ICT skills required to use the computers. This "distraction" took time away from the actual lesson. Learners needed more time in the computer lab to build up their ICT skills. The more time spent in the computer lab could come in the form of an additional computer literacy lesson which could be added onto the school timetable. The additional time spent in the computer lab would also assist educators in further integrating the use of the computer lab into their teaching.

8.5. The influence of Working Conditions

The Working Conditions category impacts on the Work Itself category. Bringing computers into the school with the intention of using the computers in teaching would impact on both educators and learners. Positive impacts that were identified by educators were access to more reference material other than the prescribed textbook, using Cami software to address the low levels of learner literacy
and numeracy and using Excel to draw graphs in Mathematics. One area that holds promise is using the ICT resources in giving interactive lessons. These lessons allow the educator to move away from the traditional talk-and-chalk teaching method where learners are idle and the educator stands in front of the class giving the lesson, towards a more interactive lesson where learners actively participate in the lesson and use software such as Encarta, Master Maths and the Learn Channel. Educators and learners are also able to retrieve additional reference information from the Internet.

Disruptive working conditions such as technical breakdowns in the computer lab negatively impacted on the availability of the computer lab. Consequently this disrupted the teaching and threatened the curriculum sustainability. Inadequate capacity was also noted as a major problem. These problems could increase the levels of frustration amongst educators and learners which could lead to them not using the ICT resources in teaching and learning. Strong management is needed to address the availability and the capacity of the computer lab. Only when these problems are addressed will the true value of the Khanya lab become a reality to most key stakeholders.

8.6. The influence of Relationships

Strong relationships amongst the educators who use the computer lab in teaching would facilitate the success in the use of the computer lab. Having a strong supportive structure amongst the educators using the computer lab would encourage educators to continue their use of the ICT resources in curriculum delivery. These relationships would allow for constructive discussions amongst educators and also allow for mutual learning and sharing of knowledge. This would also help to further build the self-efficacy of educators, and confident educators have a high chance of successes in the classroom when using ICT resources in their teaching. The challenge here is for the school management to create the supporting structures in the school to allow for the creation as well as the maintenance of these educator relationships. The interviews suggested that the school management was not actively encouraging these relationships amongst educators.

8.7. The influence of Achievement

The Achievement category impacts on the Work Itself category. One of the main goals of the Khanya project is to reduce the digital divide in the Western Cape schools. Achieving this goal would add significant value to the DoE and, more importantly, to the educators and learners who are using the ICT resources in the classroom. Educators highlighted that the Khanya lab was adding value to the teaching by, inter alia, improving as well as enriching their teaching by providing access to a vast amount of reference information and also up-skilling learners and educators in developing their ICT skills. In order for the value added by the Khanya lab to have any real significance in the school, educators as well as learners need to feel that they are being successful in the Khanya lab. The more successes educators and learners have in the Khanya lab, the more value would be added to the school
by the use of the Khanya lab. Achieving these successes was not easy and was made more difficult by:

- the lack of integration between the computer lab and the school structure
- unwillingness by some educators to use the ICT resources in teaching
- the lack of capacity in the computer lab
- the lack of availability of the computer lab
- the lack of effective educator training and the lack of learner support

In order for educators and learners to have more successes in the Khanya lab, the school management needs to put in place support structures that will address these challenges. Educators and learners who are supported within the school structure would have more opportunities to be successful in the Khanya lab. These successes would add value to teaching.

8.8. Summary

In Figure 8.1 it is clear to see that the Company Policy and Administration category plays a significant role in the relationships between the categories identified during the data analysis of the transcribed interviews. What these relationships show is that the school management plays a central role in influencing the success of ICT school initiatives. To bring about the success of ICT school initiatives, the school management needs to champion the role of ICT resources within the school. As ICT champion the school management is responsible for shifting the mindset of educators towards the proactive use of ICT resources in education. The school management is also responsible for influencing the operational success of the computer lab. School management that is successful in managing the computer lab would bring about a positive influence on the rest of the relationships between the other categories. The positive influence of the Company Policy and Administration category on the rest of the relationships between the other categories would bring about the success of ICT school initiatives.
9. Recommendations and future research opportunities

9.1. Introduction

The respondents in the study highlighted several challenges impacting on the success of ICT school initiatives. These challenges were discussed in Chapters 6 and 7. Chapter 8 showed that most of the challenges are interrelated. In this chapter recommendations are suggested that could be used to address the challenges identified in the study and, in so doing, improving the chances of success of ICT school initiatives. The recommendations will be split into sections with the focus being on the school management, the educators and Khanya.

Throughout the course of the study, it became apparent that there are additional areas of concern when it comes to the ICT school initiatives. Areas that stood out for the researcher were the following: relationship challenges between the Khanya office, the DoE and the school, the need for better educator training and assistance for learners in the use of the ICT resources. In this chapter these additional concerns are contextualised and recommended as future research opportunities.

9.2. Recommendations for the school management

The school management is an important stakeholder in the success of ICT school initiatives. The previous chapters identified the following contributions needed by the school management in order to encourage the success of ICT school initiatives:

- to establish and proactively promote a clear vision and purpose for the Khanya lab at the school
- to become the ICT champion of the Khanya lab at the school by promoting the use of the Khanya lab in curriculum delivery
- to efficiently manage the ICT resources
- to actively support the educators and learners using the Khanya lab

In both schools, the school management did not play an active role in the promotion and management of the Khanya lab, which meant that these responsibilities became an impossibility to achieve. Based on this, it is recommended that the school management should get involved in the promotion and management of ICT initiatives. This would require finding out what the role of the school management is as an important stakeholder in management of the Khanya lab. To include the staff at the school and determine their needs in relation to the use of the Khanya lab and then plan how the school management will meet these needs. The school management would not be able to achieve these objectives on their own, which means that the school management would need assistance from other stakeholders.
As ICT champion, the school management needs to establish a formal ICT committee at the school. There was no clear indication given during the interviews that the schools had a formal ICT body to deal with issues relating to the computer lab. The ICT committee would create formal communication channels within the school which educators could use to raise the concerns regarding the computer lab and then the school management could address these concerns with the relevant stakeholders. An ICT committee would go a long way in fostering positive long-term relationships amongst educators.

Two other important stakeholders that the school management would need to partner with are the DoE and Khanya. The school management seemed to have little input into the running of the computer lab. Proactive discussions with the Khanya office on the issue of ownership and the restrictions imposed on the use of the computer lab could bring about a change in Khanya’s policy around the deployment and use of the computer lab. The DoE is responsible for the school curriculum. The respondents highlighted that the current school curriculum did not effectively integrate the use of the computer lab into teaching. The school management could bring up the lack of integration between the computer lab and the school curriculum, but it is the responsibility of the DoE to address this lack of integration.

9.3. Recommendations for educators
One of the major deliverables of the Khanya project is having schools that are self-sufficient when it comes to the use as well as the maintenance of the Khanya lab. For this reason it is essential that educators take on the responsibility of self-development in order to become self-reliant. This challenge was to shift the mindset of those educators, who are not showing any real interest in the computer lab, towards becoming interested in the Khanya lab and to understand the benefits of using the Khanya lab in teaching. School management needed to encourage educators to take on the responsibility of developing themselves. An empowering principal was needed to change the mindset of educators. Educators must feel comfortable enough within the school to be able to challenge the current status quo when they feel that their development needs are not being met. The school management is responsible for creating a school environment that allows for constructive dialogue on the developmental needs of educators.

9.4. Recommendations for Khanya
One thing that was clear from the respondents was that the Khanya office might need to re-evaluate its approach to the training provided to the educators. The respondents agreed that the basic training was sufficient, but had concerns about the lack of ICT support visibility at the school. Another concern was the lack of follow-up sessions after training, which resulted in not creating a solid foundation for educators and ineffective training sessions with no real plan as to what the outcome of the training session should be. One of the recommendations made by an educator was for the DoE to provide curriculum support material to educators that used the computer lab in curriculum delivery. This support documentation would help educators when using the computer lab for their subject area.
Ultimately educators who are adequately trained in order to effectively use the computer lab would lead to the empowerment of those educators, as well as to the success of the Khanya project at the school.

9.5 Future research opportunities

9.5.1. Relationship concerns amongst key educational stakeholders
It was clear from the study that the school management in both schools were not in a position to deal with many of the concerns and challenges associated with the Khanaya lab on their own. The school management needed help from other key stakeholders such as the DoE and the Khanaya office. All three key stakeholders need to see themselves as partners in the finding of solutions to the concerns and challenges associated with the Khanaya lab. The respondents highlighted a breakdown in this relationship and stated that the key stakeholders were not fulfilling their required roles in the partnership. A possible area of future research is into understanding the dynamics of this partnership, as well as the challenges faced by this relationship. The results of this study could be used to address the relationship issues amongst these key stakeholders which would increase the success rate of ICT school initiatives.

9.5.2. An investigation on the appropriateness of better educator training
Many of the educators highlighted that they have challenges when using the computer lab in curriculum delivery. Educators felt ill-prepared to use the computer lab in curriculum delivery. One of the reasons for these challenges was a lack of effective educator training, in order to prepare educators to successfully integrate and use the Khanaya lab in their classroom. The issue here was not having a proper understanding of the training needs of educators. A possible area of future research is an in-depth discussion with educators to determine what their training challenges are and to identify possible solutions to these challenges. Such a study could feed into the teaching strategy used by the Khanaya office to develop and train educators to use ICT resources in education. The re-evaluation of the teaching strategy used by the Khanaya office would increase the success rate of ICT school initiatives.

9.5.3. The impact of the ICT competence of the learners on the use of the Khanaya labs
Many educators highlighted that many of their school learners are not computer literate. Through the course of the study, it became clear that the learners had not received computer literacy training. This meant that there was a gap in the process used by the Khanaya project when preparing a school for the implementation of the Khanaya lab. This gap in the training process meant that educators needed to train learners on the computer basics. This extra responsibility placed extra pressure on educators who themselves were not au fait with the use of the computers in the computer labs. A possible area of future research is to have an in-depth discussion with DoE, the Khanaya office and the educators on the learning requirements of learners who use ICT resources in education. The study should go beyond
identifying the ICT training needs of the learners and should include a focus on the school curriculum and the challenges faced by the school management when trying to integrate the use of the computer lab into the mainstream of day-to-day school activities. The DoE would play a major role in addressing the curriculum challenges. The results of this study could be used by the DoE to address the curriculum challenges, and by the Khanya office to include the possible training of learners on how to use ICT resources in education. Proactive actions taken by the DoE and the Khanya office would increase the success rate of ICT school initiatives.

9.6. Summary
Educators indicated that the implementation and use of the ICT resources as a teaching tool at the school had the potential to add significant value to the lives of both the educators and the learners. However, the potential value that the Khanya lab could add to the school was hindered by procedural and operational challenges. The educators identified that the school management needed to play a central role in addressing these issues. On their own, the school management would not be able to address the issues that affected ICT school initiatives. However, in partnership with the Khanya office and the DoE, the school management would be able to address the issues impacting on the use of the computer lab at the school. By addressing these issues, the school management would create a teaching environment that would bring about an increase in the value added by the computer lab to the school and teaching.

It is clear that, for the Khanya lab to be successful, all stakeholders need to play their role in promoting its success. It is important for the DoE, the Khanya office and the school to equally participate in making the Khanya lab a success. The DoE is responsible for the school curriculum. The gap identified was that the school curriculum did not adequately accommodate for the use of the Khanya lab. Since the DoE is the custodian of the school curriculum, it should take this opportunity to re-evaluate the school curriculum in order to give optimal time to the use of the Khanya lab. Many educators also highlighted that they were not comfortable when using the computer lab. The gap identified was the lack of effective educator training and Khanya should take up the opportunity to re-evaluate their educator training approach when it comes to the use of the Khanya lab. Learners are part of the education experience and in order to benefit from the use of the Khanya lab, the learners need to be active participants in the learning process. The DoE, Khanya and the school play important roles in preparing learners for the use of ICT resources.
10. Conclusion

ICT school initiatives have the potential to add much value to the educational experience at the school. However, the actual achievement of this added value by the educators and learners was marred by challenges. The aim of this study was to identify the factors that influence the success of ICT school initiatives. The study focused on the perspectives held by the educators who used ICT resources in curriculum delivery. Herzberg’s Motivational-Hygiene theory was used to identify those factors that motivate and hinder the successful implementation of ICT initiatives in the Western Cape schools. There were significant parallels between Herzberg’s Motivational-Hygiene theory and the results of the study. Sections 10.1 and 10.2 draw conclusions to the discussions held throughout this thesis, on the factors identified by educators that either motivate or hinder the success of ICT school initiatives.

10.1. Success of ICT school initiatives – Educator support

Educators play a pivotal role in curriculum delivery. With the Khanya project, the educators would be extended to use ICT resources in curriculum delivery. The success of ICT school initiatives was therefore dependent on educators who were comfortable in using ICT resources for curriculum delivery. It is therefore essential to have effective educator support structures in place within the school, in order to develop and support educators in the use of ICT resources in curriculum delivery.

The respondents highlighted that support structures are essential in assisting educators in the use of ICTs. Educator training in order to use the ICTs in curriculum delivery was highlighted as a primary support service. Secondary support services included support forums where educators would ask for help and share ideas on the use of the Khanya lab, a mentorship programme for principals who needed help with the management of the Khanya lab at their school and providing the support services of a lab Administrator who was not an educator at the school. The lab Administrator would support educators when using the computer lab.

Learners play a central role in the success of ICT school initiatives. This is a challenge for disadvantaged schools since most of the learners have limited computer literacy skills. This has a negative impact on the success rate of the ICT school initiatives. Learners were not prepared for an ICT curriculum and this placed an additional burden on educators who now had to teach computer literacy skills to the learners before teaching their subject. The respondents indicated that learners need support to develop their ICT skills. Respondents emphasised that the provision of computer literacy training to learners would enhance the chances for success and the added value of ICT school initiatives.
Continued success of the Khanya lab was only possible when the school and educators took on the responsibility to maintain and support the Khanya lab. The ICT school initiative would only become self-reliant once educators actively pursued their self-development to use and support the Khanya lab. Without taking the responsibility for self-development, the Khanya project would struggle to be successful.

10.2. Steps towards enabling the success of ICT school initiatives

The value added to the schools by the ICT resources was not automatic; detailed planning was needed in order to benefit from the use of ICT resources within schools. Successes in using ICT resources in the curriculum delivery would ultimately add value to the school. The literature and the respondents placed a strong emphasis on the role that school leadership would need to play in order to ensure the success of ICT school initiatives. To enable the success of ICT school initiatives, a strong school leadership would need to actively champion the use of the ICT resources by the educators within the school structure. Change would be needed at the school in order for the ICT school initiatives to be successful; this change would be driven by the school leadership. Fullan (2001) added that it was not possible to bring about changes in education that would be lasting when schools were lacking a clear vision.

A clear vision that expresses the purpose of the computer lab was also important. This vision for the computer lab, created by the school leadership, needed to be supported by the rest of the teaching staff at the school. Without a strong school leadership and a clear vision for the computer lab at the school, the computer lab would struggle to be successful (UNESCO, 2002). In order to build a culture of ICT usage within the school, the educators within the school need constant encouragement by the school leadership. Part of this encouragement is for the school leadership to act as an enabler to build supportive relationships amongst the educators within the school. The purpose of these relationships is to provide a supportive structure for those educators who are struggling with challenges when using the Khanya lab.

Active management of the school’s resources also played a critical role in the success of the Khanya lab. Schools need to have access to financial resources in order to sustain the operation of the computer lab at their school. Khanya refers to this as ensuring the financial sustainability of the Khanya lab. Both schools had financial constraints which meant that these schools would need financial help in order to ensure the success of the Khanya lab. The DoE and the Khanya office are key stakeholders in the success of the Khanya lab and, for this reason, would need to find creative ways to assist these schools in order to address the financial needs associated with the Khanya lab.

The school timetable was also a structure, available to the school management, which could be used to enable the success of the Khanya lab. By structuring the school timetable to include computer literacy periods at the school, the school management would effectively initiate the integration and the
use of the Khanya lab into the day-to-day teaching activities of the school. Clear leadership and effective planning by the school management would be needed in order to achieve the successful integration and use of the Khanya lab in the school.

Having a computer lab, in which all computers were operational and available to both the educators and learners to use, was essential for the success of the Khanya project. The availability problems experienced by the schools were compounded even more by the capacity constraints associated with the Khanya lab. Having one computer lab with 25 computers was a significant challenge identified by educators that impacted on the success of ICT school initiatives. Respondents highlighted that more ICT resources were the answer to the capacity issue, while effective technical support from the Khanya support team was the answer to the availability issue. The school management in partnership with the DoE and the Khanya office need to proactively work together in order to address these concerns.

10.3. Summary
Ultimately all stakeholders must play their part in order to make the Khanya project a success. Although the educator is the most important stakeholder when it comes to the use of the computer lab in curriculum delivery, the school leadership, the Khanya office and the DoE play a central role in creating a schooling environment in which the educator, the learner and the Khanya lab are fully supported and in which educators and learners are able to strive and be successful.
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The educators' perspective of the factors that influence the success of ICT School Initiatives within the Western Cape


12. Appendices

Appendix A: The Organisation Structure of the WCED (WCED, 2009)
Appendix B: Interview Consent Form

UNIVERSITY OF CAPE TOWN

Department of Information Systems
Leslie Commerce Building
Engineering Mall, Upper Campus
OR Private Bag, Rondebosch 77001
Cape Town
Tel: 650-2261
Fax No: (021) 650-2280

INTERVIEW PARTICIPATION CONSENT FORM

One of the partial requirements for completing a Master's Degree in Information Systems at the Department of Information Systems in the Faculty of Commerce at the University of Cape Town is the completion of a dissertation research project.

The researcher, in this case Zane Davids, has chosen to perform a study entitled "Beyond ICT educator training – A perspective from educators on the factors that influence the success of ICT school initiatives within the Western Cape."

The main research objective of this study is to find out:

- What are the factors that influence the success of ICT initiatives within schools? The key players in the research will be the educators who are responsible for teaching the curriculum and the school administration who is responsible for the management of the school and its resources. Understanding these factors can play a role in improving the success rates of ICT school initiatives.

The study will be conducted through a case study, employing interviews as the research instrument for the study.

An issue that is of utmost importance to the researcher, the department, the faculty and the University of Cape Town at large is research ethics. Consequently, the researcher guarantees the confidentiality and anonymity of the details and comments you provide, which will strictly be used for the sole purpose of the aforementioned research report. Furthermore, your participation in this study is entirely voluntary. You may choose to be excluded from the study at any point in time.
without incurring any adverse consequences. If you so choose to be involved with this research project, please sign the consent form below.

Contact Name: ____________________________________________
Company Name: ____________________________________________
Signature: ____________________________________________
Date: ____________________________________________

In Closing

Thank you for the time and energy you have spent participating in this study. Your contribution has been most valuable. I would like to assure you once again that your details will remain confidential and your comments will only be used for the academic purposes of this study. As a token of appreciation, the main findings of this study may be emailed to you on your request. Please provide your email address in the space provided below.

Email Address: ______________________________
Appendix C: Confirmation Letter of Study (Department of Information Systems)

UNIVERSITY OF CAPE TOWN

Department of Information Systems

Leslie Commerce Building
Engineering Mall, Upper Campus
OR Private Bag, Rondebosch 7701
Tel: 650-4670
Fax No: (021) 650-2280

11th February 2009

To whom it may concern,

Certifying that Mr Zane Davids is a Masters Student in Information Systems
This is to certify that Mr Zane Davids is a student in the Masters Degree programme in the Department of Information Systems, University of Cape Town. I am the academic supervisor for his Masters dissertation entitled “Beyond ICT educator training – A perspective from educators on the factors that influence the success of ICT school initiatives within the Western Cape”. For his research he will need access into schools using ICT for teaching and learning. Your assistance in this regard would be greatly appreciated.

Should you have any questions, do not hesitate to contact me.

Yours sincerely,

Dr. Wallace Chigona
Senior Lecturer in Information Systems,
Co-ordinator Masters Degree Programme
E-mail: Wallace.chigona@uct.ac.za
Phone: +27216504345 +27765204125
Fax: +21216502280
# Appendix D: Application Research form to the WCED

**APPLICATION TO CONDUCT RESEARCH IN PUBLIC SCHOOLS WITHIN THE WESTERN CAPE**

<table>
<thead>
<tr>
<th>Applicant details</th>
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<tbody>
<tr>
<td><strong>Title:</strong> Beyond ICT educator training - A perspective from educators on the factors that influence the success of ICT school initiatives within the Western Cape.</td>
</tr>
<tr>
<td><strong>Research question:</strong> From the perspective of educators, what factors influence the success of ICT school initiatives within the Western Cape?</td>
</tr>
<tr>
<td><strong>Respondents:</strong> The educators using ICTs in the classroom as a teaching tool</td>
</tr>
<tr>
<td><strong>Name(s) of education institution(s):</strong></td>
</tr>
<tr>
<td><strong>Research period in education institutions:</strong> At most a 2 week session depending on educator availability.</td>
</tr>
<tr>
<td><strong>Start date:</strong> 1st March 2009</td>
</tr>
</tbody>
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<table>
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<tr>
<th>Signature:</th>
<th>Date: 18 February 2009</th>
</tr>
</thead>
</table>

**FOR OFFICIAL USE ONLY**

Date approved:  
Approved by:  
Reference number:  

---
Appendix E: A list of Questionnaires

E.1. Questionnaire for Educators

INTERVIEW PROMPT SHEET

The Teacher

A. DEMOGRAPHIC INFORMATION

1. Your Name (Identity protected)
2. Name of the school?
4. May you please describe your educational background?
5. How long have you been a teacher?
6. How long have you been at this school?
7. Which subjects do you teach?
8. How long have you been using ICTs in the classroom for curriculum delivery?

B. SCHOOL ENVIRONMENT BEFORE KHANYA

10. Did the school use computers before the Khanya Project?
Yes [ ] No [ ]
11. Explain in what way computers were used in the school?
12. What did you personally use the computers for?
13. Describe your ICT skills before the Khanya Project?
14. Describe the ICT Training you had before going on Khanya Training?
15. When you first heard about the Khanya Project, what were your first impressions?

C. DURING KHANYA TRAINING

16. What was your motivation to go on the training?
17. What were your expectations of the Khanya Training?
18. Describe your experiences during the Khanya Training?
19. Describe how these experiences motivated you in your learning process?
20. Describe how these experiences acted as challenges and hindered the learning process?
21. How were your expectations met during the Khanya Training session?

22. Describe how you felt after the Khanya Training?

23. Once back at school after Khanya training what expectations did you have for yourself in terms of using the new IT skills in the class room for curriculum delivery.

D. IMPLEMENTATION OF KHANYA TRAINING

24. Think back to when you first started using ICT technology in curriculum delivery and all your experiences you have had until presently. What factors motivated you to continue using ICT technology in teaching?

25. Discuss each one in more detail.
   a. Describe what brought on the change in your feelings?
   b. How long did these feelings last?
   c. How did these feelings affect your teaching?
   d. How did these feelings affect the way you felt about being a teacher?

26. Think back to when you first started using ICT technology in curriculum delivery and all your experiences you have had until presently. What factors hindered/challenged you to continue using ICT technology in teaching?

27. Discuss each one in more detail.
   a. Describe what brought on the change in your feelings?
   b. How long did these feelings last?
   c. How did these feelings affect your teaching?
   d. How did these feelings affect the way you felt about being a teacher?

E. FURTHER SKILLS DEVELOPMENT

28. Do you feel your ICT skills have improved or stagnated since you attended the ICT course?

   Improved   Stagnated

29. May you please explain your feelings on your ICT skills?

30. What do you see as the challenges that make these improvements to your ICT skills difficult?

31. What role is the school playing in impacting on your ICT skills development?
32. Do you think that the purpose of the Khanya Project which is to reduce the digital divide within schools being achieved?

E.2. Questionnaire for School Management

INTERVIEW PROMPT SHEET

School Management

A. DEMOGRAPHIC INFORMATION

1. Your Name (Identity protected)

2. Name of the school?

3. How long have you been a principal?

4. How long have you been at this school?

5. May you please describe your educational background?

6. How long have you been using ICT in general?

7. How long have you been using ICT in the classroom for curriculum delivery?

8. Describe the surroundings in which the school is located?

9. How many learners does the school have?

10. How many teachers does the school have?

11. How many teachers went on Khanya Training?

B. SCHOOL ENVIRONMENT BEFORE KHANYA

12. Did the school use computers before the Khanya Project?
   Yes   No

13. Explain in what way computers were used in the school?

14. What did you personally use the computers for?

15. Describe your ICT skills before the Khanya Project?

16. Describe what ICT Training you went on?

17. When you first heard about the Khanya Project, what were your first impressions?
18. What were your expectations when you were given the news that your school was chosen as a Khanya School?

C. IMPLEMENTATION OF KHANYA

19. How were the teachers who went on Khanya Training selected?

20. Please describe the feedback the teachers who went on the ICT training gave you?

21. Describe any changes in the teachers who went on training?

22. Explain whether the ICT training received by teachers on the Khanya project was sufficient to equip them with the relevant skills needed to successfully operate the ICT resources within the school during curriculum delivery?

23. Explain how the teaching ability of the teachers who went on Khanya Training was affected?

24. Explain how successful the teachers were in transferring their ICT training into the real classroom environment?

25. What has been the impact of introducing computers into the school?

26. What factors in the school currently assist the school in using ICT in delivering the teaching curriculum?

27. What challenges does the school face in using ICT in delivering the teaching curriculum?

D. FUTURE OF KHANYA

28. What do you see as the role of the school administration in facilitating the continued improvement of teachers’ skills to ensure the continued future success of ICT initiatives within this school?

29. What do you see as the role of the school administration in facilitating the continued improvement of the school environment to ensure the continued future success of ICT initiatives within this school?

E.3. Questionnaire for Khanya Representative

INTERVIEW PROMPT SHEET

THE KHANYA REPRESENTATIVE

1. Your Name (Identity protected)

2. Please explain the role you play in the Khanya Project?

3. May you please explain the process that is followed when selecting a Khanya school?
4. Once a school is selected, what activities take place in order to prepare the educators and the school for the implementation of the Khanya Project?

5. May you please outline the steps followed during the ICT training programme?

6. Two of the principles identified as being necessary for the success of the Khanya Project are educator training and educator empowerment.

   a. May you please explain what is meant by educator empowerment in terms of ICT and curriculum delivery?

   b. May you please explain the process followed during educator training?

8. From your experience, what do you see as the challenges affecting educator empowerment and educator training?

9. The Khanya Project has also identified sustainability and technical self-sufficiency as two challenges threatening the ultimate success of the project. From the perspective of the educators what steps are taken in order to address the challenges and to empower the educators?

10. What factors make a school more likely to succeed in the implementation of the Khanya Project?

11. What factors make a school less likely to succeed in the implementation of the Khanya Project?

12. Can you outline the steps that are taken to rectify cases where a school is identified as being at risk of project failure, in order to move the school back on track to success?

13. From your experience, please explain whether the Khanya Project has been delivering to its mandate of addressing the digital divide by assisting schools to acquire Information and Communication Technology (ICT) for the purpose of curriculum delivery?

14. After the Khanya Project comes to an end in 2012, what follow-up services will be offered to schools to assist them on the path of continued success into the future?

E.4. Questionnaire for Educator Supplier to Khanya

**INTERVIEW PROMPT SHEET**

**ICT Trainer (Khanya)**

1. Please state your name (Identity protected)

2. Please explain your role in the organisation?
3. One of the partners with whom you are associated with is the Khanya Project. Can you please explain the relationship between your organisation and the Khanya Project?

4. What are the types of services provided to the Khanya Project?

5. Can you please explain the origins of the ICT teacher facilitation programme offered through your organisation?

6. Please explain why there was a need to create the ICT teacher facilitation programme?

7. What makes the course different from the official Khanya Training Programme?

8. Please explain the success factors associated with the ICT teacher facilitation programme?

9. Please explain the challenges associated with the ICT teacher facilitation programme?

10. Please explain the feedback received from educators who have been on the ICT teacher facilitation programme – Positive outcomes from attending the Training programme as well as possible challenges the educators have face?

11. Please explain the future of the ICT teacher facilitation programme. Would there be a need for constant engagement with educators?
Appendix F: Technical Specifications of the Khanya lab

Table F - The standard specifications for a new Khanya lab (Khanya, 2008e)

<table>
<thead>
<tr>
<th>Technology</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard Workstation</td>
<td>• M/ATX 300W Tower Case&lt;br&gt;• INTEL MATX DDR2800 Motherboard&lt;br&gt;• INTEL CELERON 2.4 GHZ CPU&lt;br&gt;• 512MB DDR2 800MHZ DIMM&lt;br&gt;• Western Digital 160GB 7200RPM SATAII Hard Drive&lt;br&gt;• 17” CRT Monitor&lt;br&gt;• OPTICAL MOUSE&lt;br&gt;• Multimedia KEYBOARD&lt;br&gt;• WIN VISTA STARTER EDITION OEM&lt;br&gt;• Headset&lt;br&gt;• Audio Splitter</td>
</tr>
<tr>
<td>Presentation Workstation</td>
<td>• M/ATX 300W Tower Case&lt;br&gt;• INTEL MATX DDR2800 Motherboard&lt;br&gt;• INTEL CORE 2 DUO 2.4 GHZ LGA CPU&lt;br&gt;• 1 GB DDR2 800MHZ DIMM&lt;br&gt;• Western Digital 320GB SATA Hard Drive&lt;br&gt;• 17” CRT Monitor&lt;br&gt;• OPTICAL MOUSE&lt;br&gt;• Multimedia KEYBOARD&lt;br&gt;• WINDOWS VISTA HOME OEM&lt;br&gt;• AMPLIFIED SPEAKERS&lt;br&gt;• STANDALONE MICROPHONE&lt;br&gt;• 20X DVD+RW SUPER MULTI OPTICAL DRIVE</td>
</tr>
<tr>
<td>Technology</td>
<td>Specification</td>
</tr>
<tr>
<td>----------------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Server</td>
<td>• Intel Snow Hill Server Board</td>
</tr>
<tr>
<td></td>
<td>• 2 x 2048MB DDR2 ECC DIMM = 4 GB</td>
</tr>
<tr>
<td></td>
<td>• 3x WESTERN DIGITAL SATA 3 RAID EDITION 500GB HARD DRIVES</td>
</tr>
<tr>
<td></td>
<td>• 20X DVD+RW SUPER MULTI OPTICAL DRIVE</td>
</tr>
<tr>
<td></td>
<td>• INTEL CORE 2 QUAD 2.4 GHZ CPU</td>
</tr>
<tr>
<td></td>
<td>• 1U Black Bezel</td>
</tr>
<tr>
<td></td>
<td>• 1.44MB Stiffy Drive</td>
</tr>
<tr>
<td></td>
<td>• 17&quot; LCD monitor</td>
</tr>
<tr>
<td></td>
<td>• BLACK OPTICAL MOUSE</td>
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<tr>
<td></td>
<td>• KEYBOARD</td>
</tr>
<tr>
<td></td>
<td>• WINDOWS VISTA HOME OEM</td>
</tr>
<tr>
<td>Switches</td>
<td>• Dlink 48-ports 10/100/1000Mbps + 4 Combo SFP web Smart Switch</td>
</tr>
<tr>
<td></td>
<td>• 24-10/100/1000Mbps Gigabit Ethernet ports with 2 Combo SFP (Mini GBICs)</td>
</tr>
<tr>
<td></td>
<td>• 8-port 10/100/1000BASE-T with 2 x SFP Combo Ports</td>
</tr>
<tr>
<td>LAN</td>
<td>• Category 6E cabling</td>
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<tr>
<td>Other Hardware</td>
<td>• APC 1000VA, ONLINE UPS</td>
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<tr>
<td></td>
<td>• ADSL modem</td>
</tr>
<tr>
<td></td>
<td>• SCANNER</td>
</tr>
<tr>
<td></td>
<td>• Brother HL6050DN - A4, 24ppm, 32MB, 1200x 1200 dpi, PCL-6</td>
</tr>
<tr>
<td>Support Software</td>
<td>• Ghost imaging software for network</td>
</tr>
<tr>
<td></td>
<td>• NETOP School / SYNCHONEYES monitoring and remote management for network</td>
</tr>
<tr>
<td></td>
<td>• Norton anti-virus for network</td>
</tr>
</tbody>
</table>
## Appendix G: List of Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Meaning</th>
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<tbody>
<tr>
<td>ABET</td>
<td>Adult Basic Education and Training</td>
</tr>
<tr>
<td>AsgiSA</td>
<td>Accelerated Shared Growth Initiative for South Africa</td>
</tr>
<tr>
<td>BECTA</td>
<td>British Educational Communications and Technology Agency</td>
</tr>
<tr>
<td>BET</td>
<td>Brazilian eLearning Teacher Training (K-12 project)</td>
</tr>
<tr>
<td>CSIR</td>
<td>Council for Scientific and Industrial Research</td>
</tr>
<tr>
<td>DoE</td>
<td>Department of Education</td>
</tr>
<tr>
<td>FET</td>
<td>Further Education and Training</td>
</tr>
<tr>
<td>GET</td>
<td>General Education and Training</td>
</tr>
<tr>
<td>ICTs</td>
<td>Information and Communication Technologies</td>
</tr>
<tr>
<td>IT</td>
<td>Information Technology</td>
</tr>
<tr>
<td>LAN</td>
<td>Local Area Network</td>
</tr>
<tr>
<td>MEC</td>
<td>Member of Executive Council</td>
</tr>
<tr>
<td>NAPTOSA</td>
<td>National Professional Teachers' Organisation of South Africa</td>
</tr>
<tr>
<td>NEPAD</td>
<td>New Partnership for Africa's Development</td>
</tr>
<tr>
<td>NQF</td>
<td>National Qualifications Framework</td>
</tr>
<tr>
<td>PDoE</td>
<td>Provincial Department of Education</td>
</tr>
<tr>
<td>SAQA</td>
<td>South African Qualifications Authority</td>
</tr>
<tr>
<td>SHAWCO</td>
<td>UCT's Students Health and Welfare Centres Organisation</td>
</tr>
<tr>
<td>TPB</td>
<td>Theory of Planned Behaviour</td>
</tr>
<tr>
<td>UNESCO</td>
<td>United Nations Educational, Scientific and Cultural Organisation</td>
</tr>
<tr>
<td>UPS</td>
<td>Uninterrupted Power Supply</td>
</tr>
<tr>
<td>WCED</td>
<td>Western Cape Education Department</td>
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