INVESTIGATING THE INTRODUCTION OF THE NEW FET TECHNOLOGY CURRICULUM. A STUDY OF THREE SCHOOLS IN PIETERMARITZBURG

by

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A dissertation submitted in partial fulfilment of the requirements for the degree
MASTERS IN EDUCATION
CENTRE for HIGHER EDUCATION STUDIES
FACULTY OF EDUCATION
UNIVERSITY OF KWAZULU-NATAL (PIETERMARITZBURG)

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DECEMBER 2010

DECLARATION

I declare that, unless specifically indicated to the contrary, this dissertation is my own original work. It has not been previously submitted in any form by me or anyone else to this University or any other educational institution for any degree or examination purposes.

All sources cited or quoted in this study have been acknowledged by a comprehensive list of references.

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ACKNOWLEDGEMENTS

My heartfelt gratitude and acknowledgements go to the following individuals and institutions that made this work possible, without their contributions and inputs this dissertation would not be what it is.

- My supervisor, Mrs R Searle for all her assistance and guidance given during this research project from commencement to completion.

- To the Kwa Zulu Natal DoE for the permission to allow this study to be undertaken in their area.

- The Principals and educator who participated in the the research collection process. Without your willing participation, contribution of time and valued responses this research project would not be complete.

- My wife, Debbie and my family for their love and unconditional support, who inspired and tirelessly motivated and encouraged me through the hard and difficult times of this study

ABSTRACT

When the National Department of Education implemented the changed FET subjects in schools in 2006 Technology was introduced as one of the new subjects. The purpose of this study aims to explore the attitudes and perceptions of school management toward the introduction of Technology in the new FET school curriculum using the following objectives.

- What are the implications of the way the National Curriculum Statement has structured Technology in the FET schools curriculum?

- How Technology is perceived as a FET General School subject and what challenges are facing these schools in adopting Technology into their curriculum?

A qualitative research approach was used whereby non purposive sampling was employed and the data was collected by means of interviews. Selected management personnel from three schools in the Pietermaritzburg area were interviewed. Findings from this study highlighted the problems that schools experienced with the implementation and maintenance of a skills based subject like Technology. These were mainly human, infrastructure and financial resource problems that manifest themselves when introducing a new subject into the curriculum. Thematic analysis was employed with conclusions being drawn from the findings. Recommendations for further study are in response to the aspects revealed through the study.

ACRONYMS

ANC	African National Congress
C2005	Curriculum 2005
CAS	Continuous Assessment
DBE	Department of Basic Education
DHET	Department of Higher Education and Training
DoE	Department of Education
DoL	Department of Labour
FET	Further Education and Training
GET	General Education and Training
HE	Higher Education
HEI	Higher Education Institution
MET	Manufacturing, Engineering and Technology learning field
MST	Mathematics, Science and Technology
NATED	National Education
NEPI	National Education Policy Investigation
NQF	National Qualifications Framework
NCS	National Curriculum Statement
NSC	National Senior Certificate
NSDS	National Skills Development Strategy
OBE	Outcomes Based Education
RNCS	Revised National Curriculum Statement
SAQA	South Africa Qualifications Authority
SETA	Sector Education Training Authority
TVEI	Technical and Vocational Education Initiative (UK)

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER 1: INTRODUCTION TO THE STUDY

This chapter begins with a brief explanation of the motivation for this study and an explanation of the positioning of Technology as a subject, in the Further Education and Training (FET) band within the South African education system and the effects it has on the training of Technology teachers. The aim of the study was to explore Technology, as a newly included subject in the FET National Curriculum Statement (NCS) and its adoption as a new subject into the FET school curriculum and some implications of this, particularly for the training of Technology teachers in Higher Education Institutions and the provision of teachers for the secondary schools.

Researchers such as Sjoberg (2003) claim that in many countries the enrolment of students in scientific and technological studies is declining or at least not developing as fast as expected. There is a noticeable decrease in the numbers of students choosing some areas of engineering and technology studies. The lack of interest often manifests itself at school level at the age when curricular choices are made. Many interest groups have voiced concern over the unsatisfactory enrolment in science and technology. Universities and research institutions are anxious about the recruitment of new researchers and education authorities are worried about the lack of qualified teachers of scientific and technological subjects (Sjoberg, 2003).

Being technologically literate is a universal goal (Rasinen, 2003:31) as society is continually being exposed to a range of technological advancements. According to researchers such as Seiter, (2009), Rasinen (2003), Sjoberg (2003) and Bybee (2000) a school curriculum should include Technology as a subject. To support this process Higher Education Institutions (HEIs) have been tasked by the State with the responsibility of training students to become teachers for the country's education sector. The training of perspective teachers wishing to specialise in FET Technology is presently being done at only one Higher Education Institution in Kwa Zulu Natal.

This initial teacher training could be affected by Technology not being adopted by FET academic schools as a school subject where learners are not picking it up as one of their elective subject choices. The Provincial Department of Education needs to recognise the position of Technology and to provide the necessary infrastructural support through its school network that will produce students with technological exposure who would be keen to be trained as Technology teachers. The viability of producing successful Technology teachers is twofold. Firstly, it's dependant on the recognition of Technology being a 'scarce learning area' (Pandor, 2005; South Africa, 1995) and secondly, it depends on the supply of suitable candidates emerging from the school system with a technologically grounded background. Teacher training in Technology requires continuous strong developmental support from subject initiation at schools right through to implementation in Higher Education Institutions. The Higher Education Institutions need to sustain their teacher training programmes so they can provide much needed trained and qualified Technology teachers for the FET schools.

As a lecturer in the Higher Education sector who is involved in the training of pre-service trainee teachers in Technology for the FET school sector, my concern is whether the inclusion of Technology as a new subject in the FET curricula is going to be accepted by academic secondary schools and how this will affect my work. It is my interest whether Technology as a 'scarce' learning area that develops learner skills vital to South Africa as a developing country (South Africa, 2006:10; Pandor, 2005; South Africa,1995) is going to be afforded the same status and value as the other academic subjects in the FET (General School) curriculum (South Africa,2005a: 23). As a subject Technology needs to be talked about in educational circles so as to increase its visibility and raise awareness in departmental officials, parents, educationalists and learners alike. In addition to official support it is vital that school managers and teaching staff recognise and value the principles and ethos that Technology has in developing learners' knowledge and skills and also display positive attitudes and perceptions toward Technology by adopting it as an elective school subject. Foregrounding Technology will elevate the educational

profile of the subject resulting in positive impact on my work as a Higher Education lecturer training teachers in Technology toward a B Ed qualification.

1.1 BACKGROUND TO THE STUDY

1.1.1 Political and curriculum change in South Africa

April 1994 marked the emergence of a new age in South Africa. The final establishment of South Africa as a democratic country meant that a lot of things had to be transformed, including the education system (Christie, 1994).

Prior to 1994, schools and their curricula were predominantly academically biased in favour of the minority white South African learner aspiring toward white collar employment. By comparison, there were very few technical or vocation schools in place for learners who wished to follow a technical direction. The technical school curriculum was perceived as being inferior suited to the non- academic learner (Goodson, 1993). This and the small number of technical schools saw a proportionately small number of white learners enrolling in technical schools. Technical high schools and Technical Colleges provided a technical curriculum which was seen to cater for the blue collar worker, whereas an elevated level of technical education was given to Technicians and Engineers at the then Technikons and Universities, now referred to as Higher Education Institutions.

Black South African learners were forced to go through the Bantu Education system which was a separate education system, with a particular form of curriculum differentiation (Muller, 2003:3) that was designed to suppress the black population and provide a low skilled labour force (Muller, 2006:66; Christie, 1994; South Africa, 1953). H.F.Verwoerd reiterated this in 1955 when he stated, “There is no place for [the] Bantu in the European community above the level of certain forms of labour” (cited in Christie, 1994:12). A restrictive curriculum emerged in basic African schools

and as a result these students weren't equipped for practical disciplines such as Technology. Mathematics, science, engineering and applied science fields and management training were learning areas excluded from African institutions, consequently an over abundance of African students studied the humanities and a large sector of society weren't exposed to any technical knowledge or practical skills (Jansen, n.d.). This resulted in a low skilled, manual labour force without any technological foundations. A discriminatory gap developed as a large portion of the country's population (black) experienced a restricted education which denied them further technical training whilst the minority population (white) could get apprenticeships or study further to become technicians or engineers. This remained restricted because of the stigmatised perceptions related to manual skills.

It was only in the latter quarter of the last century that the government realised the need to expose a greater number of learners to technical disciplines and a number of comprehensive high schools were introduced into black township areas to supplement the already established technical schools. An academic and a basic technical curriculum ran parallel in these comprehensive schools with the intention of exposing a greater number of black learners to both the academic and technical fields as they had previously been excluded from studying in these fields.

1.1.2 New Needs of Democratic Change and Global Economy

The rapidly changing world around us and the diverse needs of the South African society brought about many challenges. The working together of countries towards developing a global economy posed a particular challenge for a South Africa that was emerging from a 40 year phase of economic deprivation and other distortions of apartheid. What South Africa had was an under-trained workforce where people had been deliberately deprived of the opportunity to develop full literacy and numeracy skills that had resulted in a subsequent lack of business and technical skills. As a developing country trying to locate itself in the world economy, South Africa's

backlog and the effects of years of isolation handicapped it in competing with nations that had had no such deprivations (Jansen, n.d.).

Global advancement has resulted in a technological explosion taking place as new knowledge is being tested and developed. New developments have rapidly appeared world-wide with the introduction of new technologies. Suddenly, at the touch of a button, people can communicate, access and disseminate information instantaneously anywhere in the world by e-mail, fax, cell phone (Facebook, MXit, etc) or the internet (Skype) making the world appear to be a much smaller place (Christie, 2008). A much larger demand is now being placed on the ability to utilise new information and knowledge about products and processes and to add value to existing designs through continuous redevelopment.

Large organisations and businesses are now run differently as global economic changes have necessitated new ways in accessing, disseminating and storing data. Technological innovations such as web-based communication, internet conferencing, 'virtual' employees who work from home and collaborate in 'virtual teams' (people who work from many different worldwide locations and never meet face to face), has changed the environment in which they work. Whilst the modern workplace expects a healthy work ethic and improved proficiency in basic literacy and numeracy, there is an increased demand for;

- good communication skills
- interpersonal skills
- problem solving skills
- the ability to learn independently
- critical and creative thinking
- adaptability
- the ability to function in a team (Pretorius & Lemmer, 1998: vi)

The critical cross field and developmental outcomes (South Africa, 2002:1) that underpin the present revised South African education system firmly encompass these demands (SAQA, 2008) and are an attempt to ensure that they are an overarching feature in all curricula.

In light of the rapid changes in the world of work and in technology, greater demands are being made on the provision of relevant education and training. For countries to stay abreast of their competitors they need to;

- develop and maintain a high standard of education
- keep abreast with technological developments
- adapt to relevant changes in the global work place and
- build a dynamic corps of skilled workers (Pretorius & Lemmer, 1998: viii)

South Africa in having to deal with the gross inequalities of the past on the one hand and the effects of global changes and trends on the other hand was faced with the formidable challenge in the provision of quality education and training for its learners and workforce. Like many developed and developing countries, South Africa needed to undertake education reforms to offer up to date quality education (Pretorius & Lemmer, 1998).

1.1.3 Post Apartheid Education and C2005

The new Government of National Unity recognised that education is a basic human right and aimed to broaden access to education and training through a restructured and transformed system (Pretorius & Lemmer, 1998: 2). A new education system had to be open to individual and socio-economic needs and encompass the issues of redress and democracy in a changing South African society.

The new government viewed the previous curriculum as supporting the ideologies of apartheid and began reforming all aspects of the education system including the

curriculum. A newly introduced learner-centred educational strategy that included continuous assessment brought about a radically different approach to schooling. The previous curriculum had a traditional authoritarian style of teaching, was constrained in nature and structure, teacher-centred, textbook oriented and content based (Jansen & Christie, 1999: Olivier, 1998). Learners were encouraged to memorise a collection of facts and concepts to be used during examinations. They were either passed or failed depending on their ability to master, remember and recall the learning content (Olivier, 1998: 21; South Africa, 1997). This shows how redundant the curriculum was in a post-modern world, and therefore justified a call for change.

The new approach to education in South Africa is characterised by the principle of Outcomes-Based Education (OBE) and continuous assessment (CAS). This outcomes-based approach describes the skills, knowledge, understanding and values that are the results of learning. It focuses on learning outcomes rather than on content acquisition with a greater emphasis placed on problem solving and the transfer of skills (Olivier, 1998: 21; South Africa, 1997). This approach cherishes the ideal of preparing and producing thinkers who are able to play a significant role in the development of the country (South Africa, 1997).The outcomes-based approach was designed to encourage learners *how* to think rather than *what* to think which is a skill required for the modern world.

Transformation in the education sector led to the birth of Curriculum 2005 (C2005) in 1997 in the General Education and Training (GET) band. C2005 underwent a further revision in 2002. The Revised National Curriculum Statement (RNCS) was an outcome of the revision. Further Education and Training (FET) and Higher Education (HE) have subsequently undergone their own individual revision processes to align their respective outcomes to their individual levels of education delivery. The new FET National Curriculum Statements (NCS) were implemented in January 2006 into the curriculum of the FET General Schools (senior secondary schools). The NCS are subject-specific documents for each of the FET specialisation subjects. Many of

the FET specialisation subjects like Languages, Mathematics, Science, Geography and History are a continuation of the GET learning areas.

The introduction of OBE brought a new approach to teaching and learning which required a new style of teaching. This resulted in teachers having to undergo in-service (INSET) training to acquire the new methods and approaches. The transformation of the curriculum resulted in some subjects being discontinued and new ones being introduced. In some instances teachers had to undergo intense training to be re-skilled in new subjects, often unfamiliar and foreign areas to them. Initial pre- service (Preset) teacher training is now being done by Higher Education Institutions as the former Colleges of Education have been closed down. This entailed Higher Education Institutions having to incorporate new teacher education programmes into traditional programmes and align and synchronise teacher training practices with emergent policy changes to make sure that new teacher training programmes are relevant, effective and sustainable (Carl, 2008; Steyn & Mentz, 2008).

1.2 NQF LEVELS

Academic and vocational skills were integrated through the establishment of the National Qualifications Framework (NQF) in an attempt to “eliminate the prior distinctions between education and training” as these were seen as a “means of limiting the vocational prospects of poorly trained workers” (Fiske & Ladd, 2005:156).

A report by the National Committee on Further Education entitled ’A framework for the Transformation of Further Education and Training in South Africa (1997)’ recommended that the educational system should be aligned with the NQF (South Africa, 2003:4).

Table 1.1; Relationship of GET, FET and HE bands within the NQF

NQF LEVEL	BAND	GRADES
10	HIGHER EDUCATION AND TRAINING	Post school
9		
8		
7		
6		
5		
4	FURTHER EDUCATION AND TRAINING	12
3		11
2		10
1	GENERAL EDUCATION AND TRAINING	1 – 9

Adapted from NQF level descriptors (SAQA, 2008)

The National Qualifications Framework (NQF) comprises ten levels, which are divided into three bands (see Table 1.1). The General Education and Training band designated NQF Level 1 comprises of compulsory schooling up to Grade 9. Post compulsory school band, being Levels 2 to 4 (Grade 10 to 12), is referred to as the Further Education and Training (FET) band.

FET comprises of learning programmes leading to qualifications above the GET Certificate (Grade 9) to the end of grade 12 (National Senior Certificate) (South Africa, 1998 b: 26). Its goal is to promote life-long learning and education on the job (South Africa, 1998 a: 4). Post school educational qualifications offered by Higher Education (HE) are from Levels 5 to 10.

The FET band offers students the choice of three pathways: a general academic pathway from Grades 10 through to Grade 12 in General Schools (senior secondary

schools); a vocational pathway through the FET Colleges (previously called Technical Colleges) and an occupational pathway (this would be work based in conjunction with FET Colleges).

		Official	Unofficial
Type of pathway	General academic	Progression to Higher Education	Progression to employment (long term /post HE)
	General vocational	Employability	Progression to HE
	Occupational	Employment / employability	Reducing employment statistics

Table 1.2; Differing purposes for the different curriculum pathways (Young, 2006: 50).

1.2.1 Rationale for FET

The transformation of the entire South African education system began in 1994. By 1996 the transformation of the GET school syllabi into a modern, high quality curriculum that met international standards had commenced. In 2006 the new FET curriculum was implemented.

> "The defining characteristic of FET should be that it allows for more specialisation than general education and provides more context-based skills in preparing learners for Higher Education, the place of work and effective citizenship" (Zuma, 1997).

Plans were put into place to oust the existing NATED 550 (National Education) curriculum which had placed too much emphasis on knowledge acquisition through content-driven traditional teaching approaches, and to implement a transformatory curriculum that aimed to; give learners access to and success in lifelong education

and training of good quality; develop an ability in learners to think logically, analytically, holistically and laterally; and to produce learners who are able to demonstrate an aptitude to transfer skills from familiar to unfamiliar situations.

1.2.2 Design of the new FET Curriculum

The White Paper on Education and Training (South Africa, 1995) proposed the development of an alternative curriculum for the Further Education and Training (FET) band.

> The new curriculum will overcome the outdated divisions between academic and vocational education and between education and training and will be characterised … by a sound foundation of general knowledge, combined with practical relevance. The curriculum will offer the learner flexibility and choice, whilst ensuring that all programmes and qualifications offer a coherent and meaningful learning experience. (South Africa, 1998b:30).

At a later stage the National Curriculum Statement went on to specify the principles upon which the new FET school curriculum was to be based.

> The NCS is based on the principles of social transformation; outcomes based education (OBE), high knowledge and skills; integration and applied competence; progression; articulation and portability; human rights, inclusivity, environmental and social justice; valuing indigenous knowledge systems; credibility, quality, and efficiency. (South Africa, 2003:7).

1.2.3 Subject Structure

The subject compilation for FET General Schools (senior secondary schools) has been reworked within the context of social, economic development and globalisation imperatives following from the recommendation of the report. The most significant change being the reduction in the large number of subjects that had previously been offered. The National Curriculum Statement for Further Education and Training now comprises of twenty-nine nationally approved subjects arranged into the twelve organising fields of learning, (South Africa, 2005d: 23). Languages are not included in the twenty-nine subjects.

To attain a National Senior Certificate (NSC), the rules of combination require that every learner must complete four compulsory subjects (Group A) together with three electives subjects (Group B) (South Africa,2005a: 6). Learners elect their Group B subjects from their particular school's subject mix in addition to the four compulsory subjects from Group A.

The FET schools had to work within the constraints of their own resources and limitations when developing their new programmes and their individual learner subject package combinations.

1.2.4. Technology as a GET Subject

Technology, as a subject, was initially introduced into C2005 in the GET band from Grade 1 to Grade 9 as a compulsory new learning area. The RNCS specifies three learning outcomes and defines Technology as:

> The use of knowledge, skills and resources to meet people's needs and wants by developing practical solutions to problems, taking social and environmental factors into consideration. (South Africa, 2002:4).

The Technological Process (Learning Outcome 1) is a systematic critical and creative approach to problem solving. Learner skills are developed through investigating, making informed decisions and choices, designing, developing and realising one's ideas, communicating one's findings using various written, verbal, visual or physical and being able to critically evaluate the process (South Africa, 2002:4). The Technological process is a development process, whereby, thinking (head), emotional/attitude (heart) and practical (hands) skills are integrated and utilised through its problem solving approach in authentic real life situations.

Technological knowledge and skills are covered in Learning Outcome 2. The integrated relationship between Technology, Science, Society and the Environment are stressed in Learning Outcome 3, where a critical awareness is developed in learners as they reflect on the positive and negative impact that Technology has had on the past and present world (South Africa, 2002:5). Today's world is undergoing a diverse technological explosion which permeates all aspects of our daily lives it is thus imperative that man understands and becomes adept at dealing with society and his environment. Technology's learning outcomes firmly embrace the critical cross field and developmental outcomes (South Africa, 2002:1).

All the GET learning areas, Communication, Mathematics, Life Orientation, Science, Human Social Science, Arts and Culture are integrated into the Technology learning area in its aim to develop technological knowledge, skills, values and attitudes in learners.

1.2.5 Technology as a Specialised FET subject

Learners, wishing to study Technology in FET can either elect Civil, Electrical or Mechanical Technology together with two other subjects from Group B. Alternatively, Engineering Graphics and Design (EGD) can be chosen as either a single elective or together with any one of the other MET Technology subjects. In the past EGD (previously called Technical Drawing) and many technical subjects were taken together by learners as complementary subjects.

Learning Field	Subjects (Group B)
Manufacturing, Engineering and Technology (MET)	Civil Technology Electrical Technology Mechanical Technology Engineering Graphics and Design

Table 1.3; Four Technological subjects as they are located in the MET learning field (South Africa, 2005d: 23).

1.3 RATIONALE

A group of country-wide Technology educators held a meeting in January 2005 at which the issue of Technology as a discipline and its position in the Further Education and Training phase were under discussion. A major concern raised was that Technology, as a critical subject, may be undermined by its integration with a number of other FET subjects within the curriculum, rather than remaining a specialisation in its own right (TCCM, 2005). The FET Technology curriculum seems to have no direct progression from GET into the FET bands, but rather dissipates into a variety of subjects. Consequently, learners wishing to continue with

Technology as an elective in FET now have to select a specialised Technology area of study which has little progression from GET Technology. Another concern raised was that these new specialist subjects would now require specialised Technology teachers who would need to be specifically trained to teach them.

In responding to a letter of concern from the Technology Association on this matter of progression from GET Technology into FET Technology, Kader Asmal, then the Minister of Education replied;

> Technology lays a foundation for Design, Information Technology, Computer Application Technology, Electrical Technology, Mechanical Technology and Engineering Graphics and Design. (Asmal, 2005).

In essence this statement confirmed the concern that Technology would no longer remain as a single dedicated subject that threads it way from initiation through to exit in the education curriculum but rather would underpin a number of other subjects at FET level. The splintering of Technology in the FET band means that all learners would terminate Technology as a subject on exiting GET. Those learners wishing to continue with a technological discipline in their secondary schooling would need to select either one specialised subject like, Civil, Electrical or Mechanical Technology. The other learners would need to follow a different pathway through FET. These three subjects advance the 'engineering' aspect of specialised Technology away from generic (GET) Technology.

1.4 AIMS OF THE STUDY

Mathematics, Science and Technology (MST) subjects have been promoted as scarce subjects that need more exposure and upliftment (Pandor, 2005; South

Africa, 1995). Mathematics and Science have a continuous progressive path through the school curriculum right up to the National Senior Certificate (NSC) and into Higher Education. These subjects together with many of the other established subjects, have over time, developed their own subject philosophy and character, which has given them a firm place in the curriculum (Ankiewicz, 2003:2).

Researchers such as Ankiewicz (2003), Rasinen (2003:46), de Vries (2002:288) and Gibson, Smith, Chamberlain, Falcon, & Gerrans (1997: 176) argue that Technology is still in its infancy as a globally developing learning area and has not yet established a subject philosophy. Technology's dynamic and flexible nature has no equivalent discipline which can serve as a source of curriculum development. Although Technology has antecedent roots in the phased out technical subjects, as a new subject it does not as yet have a firm delineated recognisable curriculum path in place. In contrast to the long established subjects, Technology as a stand-alone learning area in the GET band is terminated at the end of GET in Grade 9 and is fragmented into other specialised subjects in the FET band (Asmal, 2005) where it does not lead to an exit level qualification such as the NSC which provides a pathway into Higher Education. This places Technology in a precarious position whereby the uninformed educationalists could very well shy away from Technology as a scarce and important learning area in the South African national educational framework (Pandor, 2005: South Africa, 1995), and favour the more familiar established subjects.

This study aims to explore what place Technology is afforded in the FET school curriculum and whether it is perceived to have the same value as other defined FET academic subjects by the participants of the study. It also seeks to examine some of the implementational aspects that transpire with the introduction and adoption of a new subject into the curriculum and in particular how this impacts on the training of FET technology educators in Higher Education.

1.5 PROBLEM STATEMENT

Technology which wasn't offered as a subject in the FET band before 2006 has yet to make its mark on education in this sector. It will have to compete with already established academic subjects to find its place in the curriculum. Technology does not as yet have a firmly delineated path and this path may be undermined by the already entrenched subjects which have developed solid defined paths.

As a critical subject (Pandor, 2005: South Africa, 1995) the FET Technology curriculum does not appear to have a direct progression path from the GET band into the FET band unlike subjects like Mathematics and Science which have developed a historical pathway. Technology at FET school level has been diversified into three specialist subjects (namely; Civil, Electrical and Mechanical) which gives learners an entry into studying specific technical (engineering related) subjects at an FET College level. However, neither one of the FET Technology specialisations are recognised as access subjects into Higher Education (South Africa, 2005d: 23). Higher Education has been tasked to training Technology teachers for secondary schools.

NCS policy documents for FET Technology (South Africa, 2005 a, b & c) as specialist subjects have been developed to guide and assist in the teaching and learning of this new area. Policy documents being theoretical in nature cannot predict the implications and limitations that occur in the adoption and implementation of a new subject within an education system.

1.6 RESEARCH QUESTIONS

The following are the guiding questions that focus the study. These questions also form the basis from which the research instruments were developed. They are:

- What are the implications of the way the National Curriculum Statement has structured Technology in the FET schools curriculum?

- How is Technology perceived as a FET General School subject and what challenges are facing these schools in adopting Technology into their curriculum?

1.7 ETHICAL MEASURES

This study understands the ethical measures that it has to comply with. It acknowledges all sources used, starting from the literature review, research methods, data and all participants. It recognises the participants' right not to participate, right to confidentiality and anonymity. Only selected and willing respondents participated in this study.

This study was only conducted once ethical clearance had been received from the University of Kwa-Zulu Natal (UKZN) and over and above that, a letter granting permission to access schools was received from the KZN Department of Education. Copies of these letters are attached herein as Addendum A and B.

1.8 BRIEF CHAPTER OVERVIEWS

Chapter One; gives a general orientation and background that informs the basis of this study.

Chapter Two; presents a review of literature and other related materials.

Chapter Three; outlines a detailed presentation and justification of the research methods and data collection.

Chapter Four; presents a summary and analysis of the data collection.

Chapter Five; discusses the findings, presents the limitations of the study and suggests area of further research.

CHAPTER 2: LITERATURE REVIEW

This chapter provides an overview of the fit of Technology into the post-compulsory schooling sector that has tended to be dominated by an academically-oriented curriculum which is geared toward university entrance (Christie, 1996:408). Literature in this chapter contextualises Technology as a newly introduced subject and its' adoption and implementation in the new South African FET curriculum. It also positions Technology as an integral player in preparing learners towards training for the new type of worker who is required to alleviate South Africa's skills shortage.

> The main thrust of the new economic paradigm is for well educated workers, broadly trained to deal with the rapid technological change, able to solve problems, communicate and work in teams. In essence there is a growing need for 'smart' workers who are able to use knowledge to enhance innovative capacity, raise productivity levels and inevitably, enhance our prospects of global competitiveness (Kraak, 1997:69).

As described in Chapter 1, the Technical education sector in South Africa has undergone a transition from previously being known as Technical education to Technology education which is now included in the Further Education and Training band (South Africa, 2005d). Previously, subjects such as metalwork, motor mechanics, welding were stand alone technical subjects. They have now been merged together into a single subject and have shifted in nomenclature from 'technical' to 'Mechanical Technology'. Similarly, civil and electrical subjects have been merged into 'Civil Technology' and 'Electrical Technology' respectively. The NCS document indicates that the subject content from the respective previous technical subjects have been merged, condensed and refined to form the content for each respective new Technology subject (South Africa, 2005 a, b & c). Technical

education was associated with sub standard education designed for manual work (Dike, 2009) and associated with apartheid economic and social exclusion (Akoojee, 2007. Carnavan & Doughty, (n.d.) warns against changing the name of subjects as this could be 'counter- productive' because it doesn't put across the nature and intent of the new subject, making it difficult to conceptualise and thus reinforcing historical perceptions.

Society is intensely dependant on Technology, yet the majority of us are technologically illiterate, and although Technology is included in the NCS, this illiteracy is "an anomaly to which our education system pays little or no attention to" (sic) (Akoojee, 2007). Technological literacy is very important as society is being continually exposed to a range of technological advancements, virtually daily, and thus a school curriculum should include Technology (Seiter, 2009; Rasinen, 2003; Sjoberg, 2003; Bybee, 2000:27) and a knowledge of Technology also opens learners to available career opportunities and toward specific job requirements (South Africa, 2005 a, b, & c).

2.1 TECHNOLOGY as a SOCIAL CONSTRUCT

Everything we do today is based on Technology in one form or another. Many people would have difficulty in existing without their motor vehicles, radios, computers, stoves, televisions, hairdryers, and ball-point pens, to name but a few everyday objects. These have been developed and produced by man to make his everyday life easier and better and his daily living conditions more comfortable. In the Revised National Curriculum the DoE states that;

> Technology has existed throughout history. People use the combination of knowledge, skills and available resources to develop solutions that meet their daily needs and wants. Today people still have needs and wants. However, the knowledge, skills, and resources used to find solutions are of a different kind

> because of accelerating developments in Technology. Today's society is complicated and diverse. Economic and environmental factors and wide range of attitudes and values need to be taken into account when developing technological solutions. The development of products and systems in modern times must show sensitivity to these issues (South Africa, 2002:4).

Rasinen (2003) did a study in which he analysed the Technology Curriculum of six countries. He established that each of the countries he researched had a different focus of technology education and that dissimilar names were given to technology education in each of the countries, such as technics, design and technology, technology education and technological education.

His research established that the curriculum in Australia is based upon the rationale that people must learn about technology, as they face it every day. The overall goal is to recognise the current and emerging economic and social needs of their nation and to provide responsive skills which will allow students maximum flexibility and adaptability in their future employment and other aspects of life.

In England the Design and Technology curriculum is intended to prepare pupils to participate in tomorrow's rapidly changing technologies. Through technology education their pupils learn to think and intervene creatively to improve the quality of life. They become autonomous and creative problem solvers, as individuals and as members of a team. Through needs, desires and opportunities they develop a range of ideas in order to design and make products and systems (Rasinen, 2003).

The study went further to show that in France, the Technology Education curriculum aims to clarify the interconnections among work, products and human needs, and the effects of technology on society and culture. Specifically, Technology education gives pupils an opportunity to become acquainted with technical systems, learn to

use the correct language of the discipline and learn how to use develop expertise in solving a problem using a variety of solutions. They also learn to “observe and build connections between schools and enterprise, take a critical stand and participate in the technological world without emotional obstacles” (Rasinen, 2003:36).

He suggests that the overall purpose of the Technology education curriculum in the Netherlands is to enable students to familiarise themselves with those aspects of technology that are significant to the understanding of culture, to the way in which the pupils function in society, and to the development of pupils technical abilities The Netherlands technology curriculum also aims at acquiring knowledge and understanding of the function of technology, its close relationship with natural science and society, and learning to design and develop solutions for human needs).

Whereas he found that, “Tecnik” (technics) is the name given to the Swedish Technology Education curriculum. The Swedish curriculum aims to develop an understanding of the essence of technics, particularly, an understanding of the impact of technology on production, society, physical environment, and living conditions. This curriculum includes the history and development of a technical culture, the effects of technics on people, society and nature. It also develops an awareness of technics in the world of the student. Students need to update technical knowledge, use technics for practical situations and develop confidence in their own abilities to solve technical problems.

And the underlying principle for Technology education in the United States is that every citizen should be technologically literate and be able to use, manage and understand technology. Technology is defined as human innovation in action. The frame work of Technology is based on the universals of Technology comprising of knowledge, processes and contexts (Rasinen, 2003).

In comparison the South African Technology curriculum focuses on utilising and applying the technological process from conceptual design through to the process of problem solving, as well as the application of scientific principles (South Africa, 2005 a, b, & c) which are similar to the focal points revealed by Rasinen in his research.

This study shows that all countries are grappling with technological illiteracy and are experimenting with different curricula and focus to address the same issue. The study went on to find that regardless of the name used, the different curricula or the different focus in each country the "universal goal [of Technology as a subject] was to help students to become technologically literate" (Rasinen, 2003:31).

The importance of our country's economic growth and the social well being of our communities is underpinned by Technology (Gibson et al., 1997) which as a subject in the South Africa curriculum provides scope for the improvement of different processes and products as emphasised through its learning outcomes, in order to enhance the quality of life. The NCS emphasises the Technological process which develops learners' problem solving skills, assists in individuals understanding and applying technological knowledge, skills and values, and furthermore, it also develops learners awareness of the impacts, effects and uses of technology in society, the environment and the economy (South Africa, 2005 a, b, & c: Gibson et al., 1997: Rasinen, 2003). Gibson maintains that in the Technology curriculum aims to develop citizens who are innovative, critical, responsible, effective, and have positive attitudes, perceptions and aspirations toward technologically – based careers that are utilitarian and more practical in nature rather than occupations that are more cognitive in nature and are supported through university academia. The new subject's focus is not subject knowledge but 'design and technological capability' which makes it fundamentally different to the rest of the National Curriculum (Paechter, 2000:64). Ogunniyi (1998:6) suggests that, "the need driven dimension of Technology gives [it] its own character".

According to Van Deventer (2008:132), the DoE (South Africa, 2004:1) suggests that it is "imperative that the [education] system produces more young people with high levels of knowledge and skills in mathematics, science and technology". It is therefore essential that Technology be included in the South African school curricula if it is our desire to increase society's level of technological literacy and allow people in society to contribute to and critique technological developments from an informed position (IPENZ; 2001).

2.2 CURRICULUM

2.2.1 Intended and Enacted Curriculum

Literature reveals a number of differing meanings and definitions explaining the concept of curriculum. An acceptable understanding of curriculum can be gleaned from within the context of its application (Bertram, Fotheringham & Harley, 2001).

Curriculum can be seen by some as an intention or plan of what is expected to occur. This could imply a range of subjects with their individual syllabi that are approved at a particular level of study within a particular educational system. Pratt (in Bertram et al., 2001) defines curriculum as an overall plan;

> …a plan for teaching and instruction …Curriculum is analogous to the set of blueprints from which a house is constructed. A plan can be viewed as a blueprint for instruction.

Whereas Inlow in Stenhouse (1975) suggests that a planned curriculum can lead to learning outcomes;

> Curriculum as a planned composite effort of any school to guide pupils learning toward predetermined learning outcomes.

In many instances curriculum is equated to a syllabus and in turn is limited to the subject content or a body of knowledge that is required to be taught. Curriculum is now seen as a vehicle through which educators lead their learners to intended outcomes to become useful and competent citizens in their communities and in the nation as a whole. This view is limiting in that it doesn't allow for any planning in curriculum change and development (Stenhouse, 1975).

Stenhouse (1975) suggests that a curriculum should have identifiable goals and purposes that are set out in clear terms as a transparent policy and should provide a set of guiding principles, concepts and procedures that need to be followed for effective implementation.

> A curriculum is an attempt to communicate the essential principles and features of an educational proposal in such a form that it is open to critical scrutiny and capable of effective translation into practice (Stenhouse, 1975: 4).

However, he maintains that we seem to be confronted by two important different views of curriculum. On the one hand the curriculum is seen as intention, a plan or prescription, an idea about what one would *like* to happen in schools. On the other it is seen as an existing state of affairs in schools, what does *in fact* happen, as the curriculum is implemented (Stenhouse, 1975: 4).

Sethole (2004) agrees with Stenhouse (1975) that there is a wide 'gap' between the official (intended) and the actual (implemented) curriculum as the challenges they address are quite different. The dislocation between curriculum policy and practice is inevitable as the goals of the intended curriculum which is influenced by a regulatory

discourse, can be regarded as stable, whereas curriculum implementation which utilises a pedagogical discourse, is dynamic and ever-changing (Parker and Adler, 2005). Different authorities use different terminology in describing the disjuncture between the way policy is expressed in policy documents and the way it is put into practice, Jansen (2001) for example, refers to this gap as policy 'disjuncture' from reality, Rogan (2004) as a 'mismatch between expectation and reality' and Drake (2006) as a 'dislocation' between intended policy and implemented policy. The existence of this gap between policy and practice is viewed as the central problem of curriculum development and the advancement of education itself (Kelly, 1989:128). Christie (1994) argues that although curriculum policies are in line with modern economic needs and 'best practice' in other countries, they are largely excellent in content. Policy needs to engage fully with implementation for it to achieve any real change in education or society.

Fullan (2001: 69) maintains that curriculum implementation consists of putting into practice an idea, program or a set of activities and new structures. Practitioners will however adapt the curriculum to suit their own contexts. If there are problems during the implementation it is modified as a way of avoiding or dealing with these problems, (Parsons, 1995:98). In reality, different interpretations and understanding of curriculum can lead to differences between the intended curriculum and the implemented curriculum. Successful implementation depends on the extent to 'which all are informed and being prepared to associate themselves with the envisaged change' (Carl, 2000:166).

It is argued here that policy can be developed at a national government level encompassing the educational intentions of the envisaged curriculum. Nevertheless, such intentions might only manifest themselves during the implementation of the intended curriculum in an authentic teaching learning environment. Technology, as a case in hand, was introduced as a subject in schools through the NCS with the aim to develop a high level of technological knowledge and skills in learners (South

Africa, 2005d: 3). The intended outcome will only become apparent over time, once the hurdles of introducing a new subject and the limitations surrounding the school infrastructure, resources and the teaching and learning environment have been dealt with.

2.2.2 Rationale for Curriculum Change

As outlined in Chapter 1, before 1994 the South African education system was characterised by an unpredictable curriculum policy environment (Jansen & Christie, 1999:4). Numerous investigations undertaken reveal that there was a need to restructure the curriculum to reflect the values of the new democratic society born in April 1994 (Cohen & Pahad, 1997:2; Carl, Volschenk, Franken, Ehlers, Louw, van der Merwe, 1988:1).

South Africa needs young people to become useful citizens of the new democracy and learners, skilled to work efficiently in new areas of the economy (South Africa, 2002; Gibson et al., 1997). A change from the former apartheid content based curriculum toward a skills based curriculum made sense. As South Africa found itself at the cross roads of change it introduced Curriculum 2005 (C 2005) into the education system. C2005 is understood to be a planned process and a strategy for curriculum change being underpinned by the elements of redress (for past imbalances), equity and development (South Africa, 2002: 8).

Change invariably brings some form of resistance in society. The new is always seen in relation to the old, and is always reinterpreted through old lenses. This often evokes a nostalgia and sense of loss and thus resistance to new ideas is often because people feel insecure (Hoadley & Jansen, 2002: 192). Stenhouse (1975: 210) refers to this resistance to change as ‘barriers’. A number of writers have identified how some of these barriers can impact on change. Barriers such as a lack of clarity about the new model, the lack of skills and knowledge to carry it out , the

unavailability of resources, materials and equipment and structures and obstacles previously and presently in place are factors that can block efforts to implement innovative change (Stenhouse, 1975: 210; Kelly, 1989:129).

Hoadley & Jansen (2002) argue that curriculum changes in response to what is regarded as valuable knowledge by those in society with sufficient power to shape the dominant discourse and to say how they think that knowledge should be organized and taught. Change must not be imposed it needs to be brought about democratically. Change strategies should be carefully and strategically planned to bring about an improvement in the present state of affairs (Hoadley & Jansen, 2002: 192).

Educators, learners, parents and communities may resist the change in the FET school structure, be it either positive or negative, as they may be unprepared or as they themselves face uncertainties through a lack knowledge or understanding around the reasons for the change. They need to be well versed and informed about the nature of change and to what extent they will be affected. They also need to given time to explore the options, gain an understanding and plan for new changes. Carl (2000) suggests that it would easier for the affected parties to accept the change as they would then be in an auspicious position to support it, get involved in the process and be motivated to bring about the required change. Teachers are deeply affected by changes in the education system (Van Deventer, 2008).

However, Jansen & Christie (1999) suggest that the reality the process of curriculum change has so far presented is that it is a hard road to travel. The introduction of new subjects or the changing of status of some disciplines can be seen as part of the broader change in the FET curriculum which has brought a lot of challenges and many obstacles with which FET schools are now being confronted. Furthermore, Jansen also suggests that one of the challenges that this process has experienced is the lack of both human and material resources (Jansen & Christie, 1999: 152).

Rogan (2004) reveals that changes are often superficial and sometimes reveal a misinterpretation of the curriculum as teachers are often willing to implement a new curriculum but do not know how to. Confirming other studies Rogan revealed that 'school ethos and the way in which a school is managed have the greatest impact on curriculum implementation'. Their article argues the whole school is more important than professional development in particular learning areas since different approaches to curriculum change in a school can be counterproductive (Modisenyane, Rollnick and Huddle: 2004).

2.2.3 The School's Place in the Curriculum

If curriculum is a social construct as suggested by Grundy (1987:6) then planning a school curriculum is a complex procedure as the curriculum of the school is an integral part of the culture of that society. If the school is going to contribute to the needs of the society; principals, planning committees and educators need to take cognisance of these societal values, whilst, also considering human, physical, infrastructural and financial resources. Whilst principals and curriculum committees play a pivotal part in curriculum development, teachers equally play a valuable role especially in the implementation of the curriculum. Carl (2000) describes the principal's role as a curriculum leader whilst he also stresses the importance of teacher involvement. "Teachers must become partners; they must be involved with their principals in shaping of school policies, curriculum decisions … "(Carl, 2000: 259). Although, they cannot influence final decisions, it is desirable that teachers get involved as they know the pupils best and have the skills to provide vital input. Furthermore, teachers' participation can bring about a level of teacher empowerment which can contribute to opportunities for effective professional development, as well. My view is that teachers alone cannot effectively implement a curriculum, there needs to be joint collaboration between all the affected parties such as the Departments of Education, subject advisors, schools, principals, HoDs, teachers as well as parental bodies. Additionally, continuous professional support

together with teacher developmental strategies should be part and parcel of the implementation process.

Historically, the senior secondary level of education in South Africa has been separated into different institutions for general academic education and vocational (technical) education. High schools have provided an academic curriculum; technical high schools have straddled the academic/vocational divide with a bias towards a vocationally (technically) based curriculum, whilst technical colleges have focussed on a vocational curriculum. The subject of this research is around the new high school (FET) curriculum that now incorporates technologically based subjects into what was previously an academically favoured curriculum.

2.2.4 Differentiated Schools

Before 1994, just being at school was a social advantage, nowadays, “it makes a big difference ‘which school’ a pupil attends” (Christie, 2008:176). In industrialised countries where there is mass schooling, differentiated schools have developed.

Research that was conducted by two Australian researchers, Teese and Polesel (2003), into different schools structures indicates that there is a consistent difference between the schools that serve rich and poor communities. Schools that serve the rich communities they have labelled ‘fortified sites’, whereas in contrast, schools that serve the poor communities, are labelled ’exposed sites’ (Teese & Polesel, 2003).

Teese and Polesel (2003) have differentiated the sites (schools) as follows;

- Fortified sites: Parents of high economic status will choose schools to maximise the advantage of their children. They will move suburbs, or pay high fees, in order for their children to attend particular schools. The schools they choose generally have well trained teachers, particularly in mathematics and

physics. The strategy used by parents is to 'pool their resources' in schools such as these, in order to maximise the individual advantage of their children. Through the pooled material and symbolic resources of parent communities these schools are 'fortified' against the demands of the academic curriculum (Teese and Polesel, 2003:197).

- Exposed sites: In terms of the academic curriculum these schools serve the working class and poor communities. In these schools, there are high concentrations of learners who struggle with the curriculum. It is not a cultural advantage that is pooled at these sites, but multiple disadvantages - poor language skills, fragmented family lives, poverty, low levels of parental education, lack of facilities, leisure that is distracting rather than supportive of school. These are indeed 'exposed sites' in which effective learning depends very largely on the capacity of the teachers to make up for the gap between what the academic curriculum assumes about students and who students really are (Teese and Polesel, 2003:123).

They argue that there is no parallel strategy between the 'fortified sites' and the 'exposed sites'. Schools that serve the rich and the poor communities are set widely apart in terms of both social level and academic achievement. Their research suggests that learners from 'fortified sites' have material and symbolic advantages in facing the challenges of an academic curriculum that offers them subject choices (see Table 4.2, Schools A & B) which satisfy the entry requirements for Higher Education, thereby giving them more employment opportunities at higher levels. Whereas, learners from the 'exposed sites' are presented with a more practical utilitarian type of curriculum (see Table 4.2, Schools C) that is more inclined toward 'working class type of employment' or maybe even toward menial employment (Teese & Polesel, 2003). Christie (2008:176) suggests that in comparison to 'fortified sites', the 'exposed sites' have few advantages in facing the curriculum. 'Exposed

sites' which serve poorer communities are more likely to provide supportive social environments than maximise on high academic achievement (Christie, 2008:178).

'Fortified' schools in South Africa can be referred to as 'advantaged or privileged' schools whilst 'exposed' schools can be called 'disadvantaged' schools. Apartheid separated different races by residential areas. The best 'advantaged' or 'privileged' schools tend to be found in the formerly white residential areas whereas the 'disadvantaged' schools are located in the segregated black residential areas (townships) which are physically separated from the cities or from previously all-white suburbs (Fiske & Ladd, 2005).

The previous apartheid government allocated resources to schools on the basis of race. The legacy of apartheid left a differentiated school structure where white schools were well funded with more than adequate human and infrastructural resources that supported an enriched curriculum. Whereas, in contrast for the black population there was an underinvestment in school facilities, poorly trained teachers and principals and an impoverished curriculum (Fiske & Ladd, 2005). Mason (1999:140) alleges, "Apartheid's legacy left both a desperately under-educated population and a schooling system lying in tatters". Jansen (1999), Fiske & Ladd (2005), Todd & Mason (2005) and Vambe (2005) all express a concern about the wide gap between the privileged and disadvantaged schools.

Since the dismantling of apartheid many emerging black middle class families have moved away from the townships into previously white areas and started enrolling their children in these 'advantaged or privileged ' schools with the intention of maximising their individual children's educational opportunities. As formerly white schools the 'advantaged schools' "maintained a privileged status" (Christie, 2008:179) and most of them were able to draw black learners who could afford their fees and were prepared to commute daily from the suburbs and nearby townships.

Although the 'disadvantaged schools' have received some (albeit limited) support and improvements from the government to address the discrepancies in the education system, they remain underfunded and impoverished (Fiske & Ladd, 2005) and still predominantly serve the poorer communities. The deliberate under-resourcing of black schools under apartheid was "designed to produce failure in order to channel black pupils into menial employment" (Mason, 1999:141). Alister Sparks, a journalist writes that the typical black learner faced a system "designed to stifle ambition and train a working class" (cited in Fiske and Ladd, 2005:45). The redistribution of resources from rich to poor provinces and schools has "not worked powerfully enough to make up the differences between schools" (Christie, 2008:179). Christie suggests that the following steps need consideration;

- supply and support well-prepared teachers in disadvantaged schools
- give all pupils access to a 'really universal pedagogy' that presently only some pupils have
- redistribute resources that meet the learning needs of the learners
- apply affirmative or transformative measures of redistribution and recognition that redress different sources of social injustice. (Christie, 2008:180)

The present NCS that affords both the 'privileged' and 'disadvantaged' FET schools equal opportunities to present the identical spread of FET subject in the curriculum to their learners even though the low income of many black South Africans combined with their residential segregation (apartheid's success) restricts their access to better schools (Fiske & Ladd, 2005:54). The policies of the past government prevented a large sector of society from being exposed to any technical knowledge or practical skills education and training (Jansen, n.d.) in their FET schools, today, it is the shortcomings of the system that prevents Technology from being accessible to all senior secondary school learners.

2.2.5 FET Phase of Schooling

Compulsory schooling (GET) occurs from Grades 0 to Grade 9 in the South African education system, following on is the FET band, from Grades 10 to 12 (senior secondary). FET has two features that distinguish it from the compulsory phase (GET) of schooling. As a dual purpose system;

- It represents the beginning of specialisation for learners (and therefore of student subject choice and tracking).
- It prepares learners for Higher Education and the labour market. (Young, 2006: 49).

These two features of the FET system focus learner progression toward Higher Education and employment. The implications of these dual purposes and the tensions between them are not always recognised by governments which tend to stress the importance of employability as a goal. Young (2006) suggests that generally with vocational courses there is an emphasis on the link between the curriculum and future employment (*official purpose*), whereas the aspirations of a growing number of learners is to aspire to Higher Education (*unofficial purpose*). The shift from the *official purpose* to the *unofficial purpose* is a phenomenon known as 'academic drift' (Young, 2006: 49). Academic drift is seen as the movement away from vocational study, by either students or institutions, resulting in more emphasis on academic study and a decrease in the appreciation of vocational qualifications (LSC, 2009). Academic drift is evident in the curriculum of the 'advantaged' or 'privileged' schools in that they point their learners toward Higher Education attainment (*unofficial purpose),* whereas, future employment prospects (*official purpose*) is the focus of the 'disadvantaged schools'.

2.2.6 Curriculum Differentiation Past and Present

All countries grapple with the tension between freedom of choice and social prescription in the design of their education system, 'sometimes couched in the trade off between what is good for democracy and what is good for development' (Muller, 2006:73). Each individual must be given an equal opportunity in the learning environment. They "should have the chance to develop and expand their knowledge to the best of their ability, and be given the chance to make the best use of their talents and capabilities as possible" (Allyson, n.d.).

The Norwood Report of 1943 (Goodson, 1993) conducted in the UK encapsulates the patterns of curriculum differentiation which had emerged through the evolution of education. The report revealed that the close association between the patterns of curriculum differentiation and social structure are explicitly linked to different occupational categories. Three clear groups of pupils emerged in the report. The first group are pupils who are destined for the learned professions; higher administrative or business posts would follow the academic tradition of a subject based curriculum, which is commonly associated with grammar schools. In the intermediatory group are 'the pupil[s] whose interests and abilities lie markedly in the field of applied science or applied arts', these would be fulfilled by the technical schools. The emphasis of the third group, the future manual worker, is on a utilitarian and pedagogic curriculum; which makes "a direct appeal to interests whom it would awaken by practical touch with affairs" (Goodson, 1993:18). The Norwood Report emphasises that a differentiated curriculum supports the social and developmental needs of individual pupils.

The Framework Report (1993) of the National Education Policy Investigation (NEPI) deliberates the pros and cons of differentiation;

> The strongest argument *against* education differentiation ... is , that providing different education experiences for various

> children, we run the risk of offering an education that is better for some (that is, of higher quality) than for others: that is, it runs the risk of producing inequality. In a society such as South Africa, which has gross social inequalities, education differentiation tends to accentuate them.
>
> The strongest argument *for* education differentiation is that specialist skills require differentiation (of curriculum, perhaps of institution, probably of finance). Since such skills are said to be vital for an economy which aims to be competitive in world markets, education differentiation is said to be essential for development (Framework Report, 1993:21).

The Framework Report assumes that some kind of differentiation is inevitable and that the tension between social goods of equity and development needs to be dealt with;

> More than any other aspects of the education system, differentiation highlights the potential tension between the values of equity and development. We assume that most significant policy players will agree that policy challenge is to find ways of maximising development while improving equity, to *manage differentiation* in such a way that social programme of education is not seriously compromised (Framework Report, 1993:21).

Muller (2006) maintains that the way to deal with the potentially undesirable side effects of differentiation is to manage and regulate them. The NEPI framework argues that managing differentiation is not doing away with it but it is the appropriate strategy for dealing with the tension between equity and development (Muller, 2003:10). The first step is to acknowledge the structural differences between

curricular subjects, “between their content, their content /concept linkage, pacing and progression requirements”. This requires the relaxation of the ‘one-size-fits-all’ of OBE and progressive pedagogy that infuses curriculum documentation (Muller, 2006:83). Thereafter the appropriate levels and progression paths can be found with the assistance of the professional knowledge community. “Only then will we be able to see what we expect our teachers to teach and our learners to learn ... a realistic reform of redress and equity of outcomes” (Muller, 2006:84).

The differential status of the various school subjects derive from their origins in the separate educational sectors (Goodson, 1993:4). Bank’s study ‘Parity and Prestige in English Secondary Education’ in Goodson (1993) highlights the close relationship between curriculum and social class. Bank’s noted that the academic curriculum was related to the vocations of the upper and professional classes. The curriculum relating to the vocations of the majority was slowly introduced, and as Banks notes, ‘as the proportion of children from the artisan and lower middle class homes increased it was necessary to pay attention to the vocational needs of these pupils and amend the “up till then” academic curriculum to subjects of a vocational nature’(Goodson, 1993:9). The subjects related to the majority of vocations were persistently viewed as being of low status, which stamped at an early age, the idea of class and inferior status on the pupil. “Viewed in this way, the notion of vocational training is not seen to advocate the underlying objective of education in preparing for vocations but rather the low status concern of preparing the majority for work” (Goodson,1993:9).

The high status of academic subjects as an acceptance toward obtaining and securing desirable and professional jobs indicates the dominance of an academic curriculum. Eggleston in Goodson (1993) commented that “a new and important feature (of an academic curriculum) ... was the redefinition of high status knowledge that which was not immediately in vocation or occupation”, rather “the mark of a ‘gentleman’ than of a worker” (Goodson, 1993:27). The school curriculum “by the very criteria ... favoured the gentry’s style” (Goodson, 1993:7).

2.2.7 Emergent Pathways of Learning

A tri-partite system of general, vocational and occupational learning pathways, which "have their origins in most countries ... between academic and vocational education" (Young, 2006: 47) have emerged in education.

Since the late 1990s South Africa has seen an emerging trend toward a bi-partite system of general and vocational education (Young, 2006). Young lists four factors that distinguish between the new and old forms of bi-partism;

- Unlike the earlier forms of bi-partism based on academic schooling and apprenticeships the new pathways are (or at least seek to be) inclusive of all learners in the post compulsory phase
- Modern vocational pathways are, like academic and general education pathways, increasingly institution based. In other words they are located in and led by schools or colleges, not by employers.
- Both pathways, in theory, allow learners to transfer between them and to progress to Higher Education
- Each pathway is increasingly differentiated by strong and weak forms in relation to the knowledge content of the programme. (Young, 2006: 48)

A major challenge for South Africa is the creation of a curriculum that is both general in knowledge content and specific to the needs of particular occupations (Young, 2006:60). The NCS attempts to address these distinguishing factors through a differentiated curriculum that identifies social injustice and development by including academic and technological subjects in the FET band.

Universities have established dominance over schooling through their position in the intellectual field. General academic curricula, suggests Ensor (2006) and supported by Young (2006), are based on subjects that are derived from modified university based disciplines. The dominant role of universities is reflected in the curricula as learners are being prepared for progression from schooling into Higher Education (Ensor, 2006:128; Young, 2006:54). Specifically in the way that school leaving examinations have been shaped by the terms of university entrance requirements (Ensor, 2006:128; Goodson, 1993:33). Goodson (1989) argues that one of the ways in which university establishes its dominance over schooling is by closely linking school subjects to university disciplines. These more academic, abstract subjects commonly offered like languages, mathematics and science for example; enjoy high status and preferential access to resources (Ensor, 2006:129). Goodson argues, "once a discipline has established a university base it is persuasively self fulfilling to argue that here is a field of knowledge from which an academic school subject can receive inputs and general direction" (Goodson, 1993:5). Although historically, the academic curriculum is also vocational in purpose in its preparation of higher status professions, it is the academic qualification which enables it to exert such a pressure on all forms of secondary education (Goodson, 1993:9).

Conversely, argues Young, "where there have been attempts to develop subjects that are not based on university disciplines, as is the case of Technology in the UK, they have not been successful and have been taken up by very few students" (Young, 2006: 54).

As mentioned in Chapter 1 Technology in the South African school curriculum is included in the NCS together with other academic subjects. As all Group B (elective) subjects have the same number of credits and are allocated the same number of teaching periods (South Africa, 2005d: 17) this suggests that the NQF has afforded parity to all these elective subjects. Technology as a subject should now be taken as being equal and having the same value and status as all the Group B subjects. This implies that pupils should be presented with different subject electives thereby giving

all pupils an equal opportunity of either an academic or technological learning environment.

As with all FET subjects, Technology culminates in a common qualification such as the new National Senior Certificate (NCS, commonly referred to as matric) at the end of senior secondary schooling (South Africa, n.d.; Young and Gamble, 2006:11).

However, despite this seeming equity there are contradictory signals. Technology, along with a few other subjects in the NCS (South Africa, 2005d: 23) is excluded from being an access subject into Higher Education. The designated subject list published by the DoE (South Africa, 2005e: 6) excludes Technology as one of the required entry subjects into Higher Education (something which could have a possible negative unintended consequence (Muller, 2006:74)). This de-differentiating strategy between the subjects, points to inequitable learning opportunities for pupils in the new FET curriculum, as some elective subjects are now perceived to be of more importance than others and thus given a higher value which elevates them into positions of acceptable Higher Education entrance requirement subjects. In Scotland, for example, Technology (it is called Higher Technological Studies) provides a credible entrance qualification for those pupils wishing to enrol for engineering course in higher education (Carnavan and Doughty, n.d.) whereas, those pupils in South Africa who elect Technology to specialise in at secondary school level cannot use Technology as an entry subject into Higher Education (South Africa, 2005e: 23) although they may utilise other acceptable high status academic subjects taken from their school subject package to gain entry to Higher Education e.g. mathematics or science. The perception that Technology is sub-ordinate and of an inferior academic value is strengthened by Goodson's (1993) suggestion that an "academic curricula in this country involves assumptions that some kinds and areas of knowledge are much more 'worthwhile' than others" (Goodson, 1993:6).

Hence, the de-differentiation features of a curriculum are a threat to social justice by further disadvantaging the disadvantaged members of society in that it "will do the opposite of what they [curriculum] are intended to do" (Muller, 2006:74; Muller, 2003:10). Furthermore, curriculum de-differentiation suggests that "technical and vocational education lacks the parity of esteem with traditional schooling" (South Africa, 1998a: 7).

2.3 EDUCATION and TRAINING

Much debate has taken place from the middle to the end of the twentieth century around the need to have a curriculum that will provide learners with suitable skills to enter the workforce. South Africa is not unique in this age old debate. Worldwide industrialised countries have found themselves experiencing similar problems in that learners exiting schools are equipped with a knowledge based education but found severely lacking in the skills needed by the labour market. Most countries have found it necessary to develop and introduce further education and training initiatives beyond compulsory schooling. Vocationally based training programmes specifically geared toward skills development are offered alongside academic programmes. Individually, countries need their further education providers to tailor contextual programmes that respond to the demands of the individual learner, the employers, the communities and their national economy.

South Africa as a country has shifted from being largely reliant on agriculture to a much more prominently industrialised economy. This shift has placed a greater demand on the education system to supply an appropriately skilled work force.

In the late 1970's and early 1980's there was enormous pressure from various stakeholders for the apartheid state [National Party] to reform the curriculum. A technical task team made suggestions for a curriculum that removed racial aspects and replaced these with a curriculum that emphasized competence with greater emphasis on skills. Some argued that the vocational and technical education

curriculum was a response to the economic climate and to a political attempt to limit academic education access to the black learner (Hoadley & Jansen, 2002: 199). There was a big difference between the recommendations and the final, bureaucratic written policy. The curriculum reforms that were ushered in by the democratic government were hugely influenced by National Department representatives with relatively little input from academia (Hoadley & Jansen, 2002:197). Many have argued that the new curriculum's focus on skills and competences has indicated a shift from a curriculum that educates to one that trains.

Hoadley and Jansen explain the difference between education and training;

Education;

> Education is associated with learning formal, academic knowledge, which is generally organized on the basis of the particular kind of thinking that is unique to a given subject or discipline. Knowledge in this sense doesn't necessarily have an external, practical value. It is judged rather in terms of the individual's ability to think and develop as a human being.

Training;

> With regard to training, the value of knowledge is defined by its direct usefulness. Here subjects tend to have a narrow focus - they focus on acquiring observable skills, on performing particular operations. In general training can be defined as developing in learners, specific skills they require to work efficiently. Many skilled people have found it difficult to retrain in order to work with new technologies because training tended to ignore the development of thinking abilities. (Hoadley & Jansen, 2002: 192)

Old economies were based on ‘Fordism’ principles of mass production, keeping costs, particularly the cost of labour, to a minimum to acquire maximum profits. Here two kinds of people were required, a low skilled worker trained to do low skill production type jobs and highly educated managers who could think, plan production and manage the workers. This separation was based on the assumption that mental labour and manual labour are different things so require different kinds of education (Hoadley & Jansen, 2002: 194). The divisive old curricula allowed for this division through education institutions (schools and universities) and training institutions (technical colleges and technikons). Education provides managers or white collar workers with an ability to think whereas training supplies blue collar workers with an ability to do things.

The accelerating pace, globally, of technological change associated with global competitiveness has made old methods (and thus education) inflexible and redundant in relation to rapidly changing technological innovations and the demands of the market. In many instances, automation has made many manual labour activities redundant. Technology (computers, machines etc.) has replaced many other jobs. Industry, emerging from this ‘post Fordism’ economy, needs to adapt to new technologies in order for it to remain competitive. This requires new kinds of workers who are conversant with mathematics, science and technology as required by technological developments as well as who possess qualities of flexibility, innovation, problem solving and who can work together. The argument here is that work under post–Fordism requires a new set of generic skills which requires education to change to meet these requirements (Hoadley & Jansen, 2002).

The ‘new’ economy demands a more flexible and integrated education system. The ‘old’ education system which inhibited movement between the academic and vocational paths no longer makes sense (Tufnell, Cave & Neale, 2002: 276). An education system that synonymously integrates education and training, that provides a means of meshing the academic and the vocational to assist in furthering skill

transfer and flexibility of qualification (Tufnell et al., 2002: 276), is what's required. In England the government introduced The Technical and Vocational Education Initiative (TVEI) as an initiative aimed at rectifying the situation. The government provided funding and resources that enabled consortiums of schools and colleges to develop curricula, with greater technical and vocational emphasis, to link schools and colleges and the world of work (Tufnell et al., 2002: 284). As Mbeki (2004) said, a vocational education and training system plays two important roles, firstly it has to bridge the chasm between a nation that is part of the global First World and part of the poor and marginalized Third World and secondly it assists with matching the skills wanted by employers and the skills offered by the labour force (Mbeki, 2004).

In all advanced economies education and training policies occupy a central position in a debate in which governments recognize the importance of education and training in providing for skills development, especially in the current context of rapid technological advances and intensified global economic competition. The policies they have adopted to achieve this have varied widely (Green, 1999:12). Britain, USA and New Zealand for example, have attempted to raise participation and achievement in education and training systems through institutional reforms that attempt to install market mechanisms, foster greater competition and efficiency. Britain has increased its central state control in education as regards curricula and qualifications whilst reducing the powers of the local authorities and minimizing the decision making roles of educationalists.

The trends are somewhat different in some continental EU countries. Centralized control has been generally reduced by attempts to devolve decision making to the lowest effective level. This has generally meant giving more power to the regions and encouraging social partners to play increasing prominent roles (Green, 1999: 13).

South Africa's education system is complex as it is administered at both a national and a provincial level. Education and training has traditionally fallen under separate

ministries. There has also been a strong distinguishing division between education and training which has continued under the present government. The Department of Education (DoE) being responsible for formal education, whilst training falls under the ambit the Department of Labour (DoL). The administration and funding of education of formal schooling is the responsibility of the nine provinces within the norms and standards set by the national ministry of education.

Post school training and national skill initiatives are upheld through the policies of the DoL. A centralized curriculum has been developed in conjunction with appropriate social partners through Sector Education Training Authorities (SETA's). Although FET colleges have been given autonomy to develop their own control structures and infrastructure, they are still bound by National curriculum and assessment strategies.

Bird and Elliot (1993) proposed a 'unified multi path model' of education and training built around a nationally integrated curriculum with a single qualification structure. The essence of this unified model was its flexibility and credit-accumulation properties. These ideas acquired hegemony within the ANC and became official government policy with the publication of the White Paper on Education and Training (South Africa, 1995) and passing into law the South African Qualifications Authority (SAQA) Act (No 58 of 1995) (Kraak, Lauder, Brown, Ashton, 2006: 18). Amongst other things the White Paper brought together a set of proposals to restructure the relationship between education and training (Christie, 1996:408). Fleisch (2002:108) argues that those who had previously been deprived of social or job mobility would acquire formally recognised new and knowledge skills by bringing together education and training.

Following on from this, the South African skills revolution began in 1998 /1999 which led to legislation being promulgated where the Departments' of Education and Labour intended to create an integrated approach to skills development. The National Skills Development Strategy (NSDS), National Qualifications Framework

(NQF) and Sector Education and Training Authorities (SETA's) were established to steer the human resource and skills development strategy forward. The NQF set about establishing a common set of qualifications designed to integrate the provision of education and training.

Simultaneously, the Further Education and Training (FET) sector was being transformed. The Green Paper for Further Education and Training (South Africa, 1998a) was published immediately followed by the White Paper on FET RSA (South Africa, 1998b). This led to the Further Education and Training Act (South Africa, 1998c) coming into being.

The DoL in aspiring to eradicate poverty and contribute to employment creation spearheaded a process that culminated in Parliament passing The Skills Development Act 1998 (Act 97 0f 1998) (South Africa, 1998d) and the Skills Development Levies Act 1999 (Act 9 of 1999) (South Africa, 2000). SETA's have been established from the main sectors of the economy and together with the DoL they are the main driving forces in implementing the NSDS and the Skills Development Act. The overall function of each SETA is to develop critically needed skills in their sector through a planned approach to education and training.

2.4 INITIAL TEACHER TRAINING

The present day South African government closed down the teacher training Colleges of Education and incorporated initial (pre-service) teacher training programmes into Higher Education. The number of institutions that provided teacher training dropped "from 122 in 1994 to 61in 2000 and then 31 in 2001" (Vinjevold, 2001). Consequently, there was a corresponding falling off in the number of students enrolled in pre-service teacher training programmes. The National Scarce Skills List (South Africa, 2007) reflects the resultant shortage of skilled educators.

The training of new teachers became a national rather than a provincial function with the responsibility of initial teacher training being shifted from the Colleges of Education to universities. Higher Education Institutions were challenged with having to merge needs with policy and incorporate new teacher education programmes into their 'traditional' programmes (Steyn & Mentz, 2008:682). They not only had to reconceptualise programmes, re-align and synchronise existing curricula, adapt to new approaches in teaching and learning but also had to provide "relevant teacher training for a constantly changing school curriculum landscape" (Carl, 2008:17).

The Bachelor of Education (B Ed) which is a 480 credit undergraduate degree is recognised as an initial teacher qualification. This degree which comprises of both the professional qualification and the subject specialisation is tailored to provide for the unique needs of each subject specialisation at different school phase levels. Pre-service student teachers can choose their specific subject area specialisation at a particular phase level, such as Technology at FET level. As a subject or phase specialist this qualification provides good grounding for the teacher (Steyn & Mentz, 2008) in the knowledge, skills, values and principles of one of the specific Technology specialisations (Civil, Electrical or Mechanical) and entitles them to teach Technology at Grades 10, 11 and 12 (FET level) in secondary schools.

Nationally, a small number of Higher Education institutions are training pre-service teachers specialising in FET Technology. The cohort of trained Technology specialists is not graduating quick enough to fill the shortfall that is presently being experienced by the schools. Furthermore, although these graduates have been prepared to teach Technology with a basic knowledge of the subject, as new teachers they lack the practical in-depth technological skills that the discipline requires. Many of these skills are developed with experience over time.

2.5 SKILLS

Literature reviewed reveals that there is considerable ambiguity and mismatch of understanding around the term ‘skills shortages’ (ANC, nd; Richardson, 2006). Whilst, the term ‘skills shortage’ can be understood as when the demand for a particular worker exceeds the supply of such worker, it is a term often used as a substitute for more general skills deficiencies in the labour market, recruitment difficulties or gaps in the market requirements (Richardson, 2006).

2.5.1 Skills Deficit

We repeatedly hear that South Africa, like many developed and developing countries world- wide, is experiencing similar problems of shortages in suitably skilled multi disciplinary people. Dike (2009: 203) revealed that “every facet of the economy has been affected by the shortage of skilled technicians”. Government policy is influenced by the idea that there are two economies. One economy is modern and creates wealth, whilst the other is filled with unskilled people unable to find jobs. President Mbeki stated that many people in the second economy do not have the skills required for a modern economy (Mbeki, 2004).

Skills deficit may in one instance imply that under the current levels of remuneration and conditions of employment an employer is unable to fill or is having difficulty in filling vacancies for an occupation or a specialized skill. Whilst, it can also apply to recruitment difficulties where although there is an adequate supply of skilled workers an employer is unable to attract and recruit suitable staff. Thirdly, the term may embrace a skills gap where potential employees do not meet the occupational requirements as they lack the required qualification, experience and/or specialized skills to satisfy the requirements of the occupation (Richardson; 2006, 5).

Richardson (2006) suggests that skills deficits can be classified according to context in which they occur. One context is where there are few people who have the

essential technical skills who are not already using them. Another context is that a *skills mismatch* occurs when there are few people who have the essential technical skills who are not using them and not willing to apply for vacancies under the current conditions. And another is a *quality gap* when there are sufficient people with the essential technical skills who are willing to apply for vacancies but lack the qualities that employers think are important (Richardson; 2006, 5).

The shortage of skills is seen as a constraint on socio- economic delivery and impacts adversely on the need to remain internationally competitive (Richardson, 2006). It can be a source of great aggravation, especially to industry. It can hamper the quality and quantity of their output as they cannot produce sufficient goods to satisfy the demands placed on them, through difficulties experienced in recruiting sufficiently skilled or specialised workers. The lack of a suitably qualified workforce is interpreted as a serious failure of the skills development system despite increases in post school training.

The skills deficit is of concern to myself and of this research as not enough emphasis is placed on the importance of skills acquisition at school level. Learners are insufficiently exposed to technological subjects and ill informed about a wide range of occupational opportunities. Schools do not provide sufficient encouragement and motivation for learners to enter into Further and Higher Education to train in technological disciplines and attain suitable knowledge and skills toward satisfying future employer requirements.

2.5.2 Skills Levels

The ANC contextualized vocational skills into three level segments. Each level is characterised by specific characteristics.

The characteristics of high skills levels are an excellent educational background, normally with a higher educational qualification, high wages, internationally mobility

and traditionally white dominated. This segment is the driver of innovation and is the basis of any transition from a developing country to a developed country (ANC, nd; Kraak, 2006).

Medium skills levels are characterised with good educational backgrounds which usually include a tertiary background commanding higher wages. Other characteristics include high literacy and numeracy skills, relatively low labour intensity, easy vertical mobilisation, low unionisation and a relative gender balance. These levels are proportionately white dominated and internationally marketable.

Low skills levels are characterised by low literacy and numeracy skills with a modest educational background, relatively labour intensive, low wages, high unionization, male dominance mainly black and have a high risk of future unemployment.

The dynamism between high and medium skills levels has a positive effect on moving to higher levels of growth. Medium skills levels will over time grow into high skills levels through the acquisition of knowledge, experience and continuous development. Whilst the low level skills are driven by the needs of the higher skills levels, one cannot underestimate the importance low skills levels contribute toward growth and development. The state needs to make a more positive investment toward developing and nurturing low skills levels in providing its citizens with suitable education and training to sustain economic growth (ANC, n.d.).

In addition to the concern about the lack of a skilled labour force to fill jobs, is the concern in the lack of people with the skills ability to create jobs. Another serious issue is the lack of people with the appropriate skills that are also needed to transform the delivery of quality education and training.

2.6 CONCLUSION

Literature on curriculum transformation has shown that there have been numerous attempts by previous South African governments to change the curriculum, not to the benefit of the nation but for political gain. April 1994 ushered in new democratic dispensation which has since strived to bring about a curriculum that has been restructured and streamlined to be compatible with the needs of the 21st century.

This chapter provided an overview of Technology as a newly included subject in the FET curriculum. Whilst Technology is afforded the same status as all the other elective subjects in the NCS document in essence it is perceived as being of a lower academic status by the virtue of the fact that it isn't recognised as an entry requirement subject into Higher Education unlike those academic subjects who have developed historical pathways through Higher Education's institutional interventions.

Furthermore it is shown that an integrated approach between the Department of Education and the Department of Labour could address the South African national skills shortage in utilising Technology at a school level in providing basic skills toward the education and training of learners' future employment.

CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

This study is qualitative in nature and falls into the interpretive paradigm. A qualitative interpretive approach will help me to study the research problem in its context and gather rich and relevant data. It brings out the attitudes and perceptions of immediate stakeholders within the context of their organisational environment. Robson (2000) suggests that this approach is a strategy for doing research work involving investigation within its real life context. Qualitative research is interested in the motives and aims, not just the behaviour of those who are studied (Sherman & Webb, 1988). Qualitative researchers want those who are studied to "speak for themselves" (ibid, 1988: 5). An interpretive strategy helps to describe, explain and analyze a subject's individual and social actions, beliefs, thoughts and perceptions (Rubin & Rubin, 1995: 2).

Field Code Changed

3.1 RESEARCH SAMPLE

Sampling is the selection of research participants from an entire population and involves decisions about which people, settings, behaviours, and/or social processes to observe. The aim of this study was to select a relevant sample of the (school) population about which the research aims to draw conclusions (Terre Blanche, Durrheim and Painter, 2006:49).

The intention was to interview staff members whose responsibility it was to select the new FET curriculum for their school. The cohort of interviewees was made up of principals and heads of the relevant department or teachers from the chosen schools. I anticipated between 3 to 6 sample interviewees would satisfy the research needs.

There are two main methods of sampling (Cohen, Manion and Morrison, 2001: 99), this can either be a probability sample (sometimes called a random sample) or a non- probability sample, which can also be referred to as a purposive sample.

In a probability sample the members of the defined group being selected are known. Every member has an equal probability of being included in the sample, inclusion or exclusion is a purely a matter of chance.

The selected members of the defined group in a non-probability sample are unknown. It seeks to only represent a particular group, where some members of the group in the non-probability sample would definitely be included whilst other members of the group would definitely be excluded. Thus every member doesn't have an equal chance.

The selectivity which is built into the non-probability sample derives from me targeting a particular group in the full knowledge that it does not represent the wider population, it simply represents itself. This is frequently the case in small scale research, for example, research conducted in one or two schools or with a particular group of teachers, where no attempt to generalize is desired and frequently the motivation for case study research would utilize a purposive sample (Cohen et al., 2001: 102).

Purposive sampling was particularly chosen for this study, as participants were deliberately and unashamedly selected, based on the strength of their experience and knowledge of their particular school environment and knowledge of the curriculum at FET level. While it might satisfy the research needs to use this type of sample it does not pretend to represent the wider school community (Cohen et al., 2001: 104).

3.2 SELECTION OF SCHOOLS

The study was piloted in the area that represented the characteristics of the chosen sample. The aim was to get a fair and just sample spread of schools for this study. Three academic schools were identified in the greater Pietermaritzburg area. The first school visited was School A which is located in the northern suburbs of the city. This was a former House of Delegates school. The second school was School B, which is located on the periphery of the city centre adjoining the southern suburb. This being an ex model C school. And the third school, School C, is located on the edge of a Black residential (township) area. This was an ex Department of Education and Training school and is now a KZN Department of Education school.

3.2.1 School profiles

The three schools are all senior secondary schools in the FET (General Schools) band which also have Grade 8 and 9 in the GET band in their structure. They are similar in that their core curriculum is formulated around the academic general subjects. They each have approximately the same number of learners and also have a representative mix of both male and female learners.

Schools A and B are both examples of ‘‘advantaged’ schools which provide a well organised learning environment supported by both the teachers and parents. All the teachers are well trained and experienced in their subject areas especially in Mathematics and Science (Teese and Polesel, 2003:197). Both schools are struggling to find suitably qualified teachers specifically to teach the subject Technology.

The majority of the learners in School A are mainly from the Indian community with about a third consisting of Black learners from both genders. These learners come from middle to working class families from the surrounding residential area and nearby townships. The buildings and grounds are well maintained. The school has

sufficient facilities, adequate equipment and is staffed by a competent teacher complement that is qualified to service the general academic curriculum. The school is, however, experiencing problems trying to acquire the services of suitably qualified and trained teachers to teach specialist subjects like Technology.

School B is an established school where the evidence of a previously privileged education system is visible. The learners attending this school are mainly from middle to upper lower class backgrounds. It is a diverse, multi cultural school that includes both genders and all the race groups of our country. Many learners come from more affluent township families. Within the school grounds are beautifully maintained buildings, manicured lawns and well tended sports fields. Hostel facilities are available for in-house boarding. The school is well resourced with classrooms, specialist venues, equipment and apparatus. Qualified teaching staff take care of the academics of the school. Numerous sporting and extra-curricular activities are also offered. The school also does not have trained specialist teachers in Technology. An untrained teacher who was prepared to take up the cudgel manages and teaches the subject with assistance from teachers from other subject areas.

School C on the other hand has the characteristics of a 'disadvantaged school' (Teese and Polesel, 2003:123). It is situated on an unkempt tract of land. The school is minimally resourced, with sufficient teaching facilities and a reasonably good staff complement. Whilst, the interior of the buildings were neat and clean, the exterior needs maintenance and upkeep. The school has an entirely Black learner population that come from low to very low income families from the surrounding township and further a-field informal settlements. Quite a few learners are being looked after by other members of the family, siblings or even members of the community. This school recognises the need for, and is willing to, provide skills based subjects. The school understands the importance of offering skills based subjects in providing a base for their disadvantaged learners to enter the job market. Although it has the available teachers, without external funding, assistance and

support it is financially hamstrung to implement some of these critically identified subjects due to the prohibitive costs of running such subjects.

The schools are further elaborated on in the next chapter.

3.2.2 Gaining Access to Schools and Consent from Participants

An interview is seen as a social, interpersonal interaction, rather than a data collection process. Research ethics were considered throughout the process. Research ethics are “a code of conduct” being the general principles of what one ‘ought to’ or ‘ought not to do’ (Robson. 2000: 29). Informed consent, guarantees of confidentiality, the interview process, methods of data collection, what will count as data and who will benefit from the research study are some of the issues that form part of the code.

Gaining permission for this study went unhindered as full support was obtained from all the officials involved. Consent was requested from the Kwa Zulu Natal Education Department to conduct this research study. Approval was granted with additional consent given to enter the three requested schools and interview their personnel (Addendum B). Ethical clearance was also granted by the University of Kwa Zulu Natal (Addendum A) to conduct this research.

Gaining access to the above schools was not difficult. The aim and outcomes of this research study together with the respondents participation was communicated to the principals. They were also assured of confidentiality and that no data would be used personally against them or against the school in any way. The collected data was safely stored and after completion and on acceptance of this study will be kept for a period of five years before being disposed of. The participants’ signed letters of informed consent are securely stored.

The participants were given the contact details of both researcher and supervisor should they wish at any stage to consult with either party. They were also informed that should they wish to leave the research, they would be freely able to do so at any stage without repercussion, (Mouton, 2001) (Addendum C).

3.3 RESEARCH INSTRUMENT

There are several available techniques that a research study may adopt. The use of research methods ensures rich and relevant data that becomes as valid and reliable as possible through the proper use of data collection techniques and strategies. I utilised face to face interviews as my method of data collection. This research strategy has been defined as a "a two person conversation initiated by the interviewer for the specific purpose of obtaining research relevant information, and focused by him on content specified by research objectives of systematic description, prediction or explanation" (Cannel & Kahn, 1968: 527, Cohen et al., 2001: 269).

3.3.1 Interview

The principle purpose of using an interview for this study as a means of gathering information has a direct bearing on the research objective. Tuckman (1972), cited in Cohen et al. (2001: 268), describes an interview as, "providing access to what is 'inside a person's head', [it] makes it possible to measure what a person likes or dislikes (values and preferences) and what a person thinks (attitudes and beliefs)".

The Concise Oxford Dictionary New Edition (1976: 566) on the other hand, describes an interview "as a meeting of persons face to face for purpose of consultation ..." These suggest that an interview is an interaction between two or more humans with an interchange of ideas of mutual interest. This also indicates there is active participation within a social situation for knowledge production and collection. Interviews allow the participants be they, either, interviewer or

interviewee, to discuss the world they live in and to express their own points of view regarding situations. Interviews are not only “about collecting data, it is a part of life itself, its human embeddedness is inescapable” (Cohen et al., 2001: 267).

Conducting an interview is a natural form of people interacting. It gives us an opportunity to get to know people, so that we can get to know how they think and feel. Interviews are particular useful in order to gain a detailed picture of a participants beliefs or perceptions of a particular topic (de Vos, Strydom, Fouche & Delport, 2005). It is also a commonly used method to source data for constructionist research. Constructivist researchers feel that whatever meanings are created during the interview is co-constructed between the interviewer and interviewee. These meanings are not only constructed by the people involved in the interview but are products of a larger social system (Terre Blanche et al., 2006).

Interviews place the participant as an expert on the subject and the participant should therefore be allowed maximum opportunity to tell his story. I can follow up on particular interesting avenues that emerge in the interview and the participant is able to give a fuller view. This method gives me much more flexibility (de Vos et al., 2005). As an interviewer you can clarify questions, correct misunderstandings, offer prompts, probe responses and follow up on new ideas in a way just not possible with other methods (de Jager, 2005: 58).

Personal interviews bring a direct face to face interaction; this brings both advantages and disadvantages as a research method. An advantage is that greater depth in response can be obtained through a combination of asking, probing and open ended questions. Oppenheim, (1992) cited in Cohen et al. (2001: 269) suggests that interviews have a higher response rate than questionnaires as interviewees become more involved and hence more motivated. Through this interaction respondents sometimes offer additional information and data which would normally not be available through a questionnaire. A disadvantage is that interviews are prone to subjectivity and bias on the part of the interviewer.

Subjectivity is related to the interviewer's background, training, competence in research and philosophical perspective; whereas bias is a deliberate attempt to hide what you have found in the study, or to highlight something disproportionately to its true existence (Kumar, 2005). Bias is unethical, more so than subjectivity.

3.3.2 Interview Questionnaire

An interview questionnaire (Addendum D) was compiled with open-ended questions to guide the interview. Open ended questions were used to get the responses from the respondents without necessarily channelling them to specific answers. This helped to solicit new suggestions and views from the respondents. The interview questions were compiled in such a way as to respond to the following research questions;

- What are the implications of the way the National Curriculum Statement has structured Technology in the FET schools curriculum?
- How is Technology perceived as a FET General School subject and what challenges are facing these schools in adopting Technology into their curriculum?

Fellow colleagues assisted in the process of developing the interview questions.

3.3.3 Conducting the Interview

Gaining the trust of the principals was essential. The principals were found to be willing to assist in this research and all agreed to be audio recorded and accepted that confidentiality was assured with the collected data. A qualitative researcher has an ethical obligation to have respect for the person and respect the privacy and safety of the participants. By referring to either School A, School B, Principle A, Principal B, etc; care was taken that no school, principal or teacher was identifiable

and they were assured that they would not be held liable for the data captured in the results.

The respondents from each school were interviewed only once. The interviews were held at School A on the 22 July 2008, School B on the 30 July 2008 and at School C on the 31 July 2008.These interviews varied from 50 minutes to one hour and twenty minutes. The respondents were interviewed in the principal's office at their respective schools. This was beneficial, as a definite appointment that suited both parties was arranged and being in their own familiar environment the interviewees felt at ease to respond freely. It also gave the respondents access to additional data should the need have arisen. The interviews were recorded using an audio recorder. Notes were also made as a back-up and to capture things that the audio recorder couldn't.

The respondents were each given copies of the interview schedule prior to starting the interview in case they needed to clarify their understanding of the questions being asked. It was felt that this was a good idea as the only Zulu speaking respondent wasn't discriminated against, although he was confident in answering in English. The respondents were allowed to talk freely, only prompting when it was felt necessary. The respondents expressed themselves freely around issues they felt strongly about. This resulted in various issues of concern being offered and a deeper insight gleaned. Lending a sympathetic ear led the respondents to deviate from the question being asked at times and talked about relevant diverse issues of concern.

3.4 ANALYSIS OF DATA

A qualitative approach succeeds in getting depth, detail and vividness from respondents (Rubin and Rubin, 1995:2). According to Rubin and Rubin depth means getting a thoughtful answer based on considerable evidence, as well as getting full consideration of the topic from diverse points of view.

Field Code Changed

“Making meaning through the act of interpretation and thus providing a basis for making decisions …,” (Grundy, 1987: 59), will be the approach used in analysing and evaluating the collected data. An interpretive researcher seeks to develop an understanding of social life and discover how people construct meaning in their natural surroundings. Neumann (2000) maintains it is the analysis of meaningful actions through the direct observation of people in their natural surroundings and the interpretation of how people create experience and give meaning to their worlds. It is based on social interactions (the process of ongoing communication) and socially constructed meanings which depend on a person’s definition of a situation and how they assign meaning to it. People are able to assign appropriate meaning only if they take the social context in which it occurs into account. People are constantly making sense by reassessing meanings until “they know what’s going on” (Neumann, 2000: 75).

The process of analysing and interpreting of the qualitative data obtained largely followed the five step process as suggested by Terre Blanche et al. (2006: 322 – 325).

Step 1 involves ‘familiarisation and emersion’ in the data.

In Step 2, the data is examined for underlying principles, ‘theme induction’, which could assist in its analysis in developing themes or categories. In this step I bring knowledge of the kinds of interpretation and kinds of emergent issues that could be supported by the data.

Step 3 requires reading through the data and matching sections of the data into categories or themes, a process referred to as ‘coding’. Coding is a data analysis process that undergoes different processes such as identifying similarities and differences, core ideas, concepts, themes and phenomena to find commonalities,

patterns and structures. The use of inductive reasoning and coding can lead to a refinement of the data as an understanding of the data increases.

'Elaboration' occurs in Step 4 and ensures all significant findings are accounted for and that the finer details haven't been overlooked. This step requires further examination of the themes and organisation of the data and can lead to a further enhancement of the codes or themes.

Step 5 involves the interpretation, verifying and writing up of the data. The data is carefully checked for interpretations and ensured it can be backed up by evidence.

The coding and elaboration process for this research was carried out manually. The analysis began by initially listening and reading each respondents interview to obtain a 'feel' for their story. Thereafter, by closely listening to the tapes and comparing the notes, transcribing from the audio tapes and notes began using a computer. This process needs to be captured as soon as possible after the interview to obtain an accurate interpretation of this real life event and phenomena. The purpose was not to collect bits and pieces of 'real life' but to place it in perspective and within the context of the research questions.

The transcribed data was captured onto separate analysis sheets for each question. Each analysis sheet comprised four columns. Each schools data was inserted into its respective column.

The transcribed interviews were then printed and coloured highlighters were used to identify themes and categorise pieces of text. The similarly coded pieces were then physically grouped into the different themes using the cut and paste function of MS Word and placed into the fourth column.

Electronic and printed versions were scrutinised and continually revised until I was satisfied with the organisation of the data.

The data was then written up after being carefully checked and ensuring that it could be backed up by evidence. In some instances it was necessary to re-read some of the original interview transcripts.

3.5 TRUSTWORTHINESS

To ensure that valid and reliable data is obtained from the study, the measurement procedures and instruments must have acceptable levels of reliability and validity. According to Leedy and Ormrod (2005:31) the validity of a measuring instrument is "the extent to which the instrument measures what it is supposed to measure" and reliability is "the consistency with which the measuring instrument yields a certain result". These are two of the most important concepts in the context of measurement (de Vos et al., 2005:160).

Cohen, Manion and Morrison (2001) argue that validity can be "achieved in qualitative research through honesty, depth and scope of data, appropriate sampling, triangulation and objectivity of the researcher". The issue of validity in this study is dealt with through the notion of honesty and trustworthiness which brings about credibility of the research.

According to Saunders, Lewis and Thornhill (2003), a mixed mode approach has the advantage that it enables triangulation to take place. Triangulation of data could not be done in this study as a single measurement mode was used. However, the reliability of the instrument and authenticity was ensured as the data obtained during the interviews was reported verbatim in this study. During the data analysis I let the data speak for itself and avoided subjective interpretation which allowed me to gain a sense of understanding and create meaning, thereby ensuing trustworthiness and validity of my study.

3.6 CONCLUSION

It has been argued here that the qualitative interpretive perspective represents an important starting point. Construction of meaning can be gleaned from interpreting and understanding human action and behaviour. A distinction was made between purposive sampling and non purposive sampling in that a specific group of interviewees were selected by the nature of their positions in the schools and their expertise and experience within the context of the FET curriculum. The use of personal interviews as a data gathering technique is consistent with the qualitative approach in obtaining deep detailed responses. The data analysis was used to ascertain whether the data extracted from the research findings responds to the key research questions.

CHAPTER 4: RESULTS

This chapter provides insights that have emerged from analysing the data that has been gathered in relation to the conceptual framework and literature review, as well as new and unexpected points that may have emerged out of the data. The data comes from responses to the interview questions administered to the respondents and from the personal observations that I made during the interview process.

4.1 RESEARCH CONTEXT

Only one interview was held at each of the three schools. Whilst, it was anticipated that between three and six people would initially be interviewed, for numerous reasons I only managed to interview four people. The Principal in School A was interviewed. The ex-HoD of Technology had recently been medically boarded and the teacher teaching Technology was not included in the interview as he had been recalled from retirement to assist with teaching the subject on a part time basis. The Principal and the only full time Technology teacher at School B were included in the interview session. The Vice Principal and HoD for Technology from School C were scheduled to attend the interview session; however the HoD had to excuse her-self just prior to the interview session, consequently only the Principal was interviewed.

School	Principal	HoD	Teachers
A	1		
B	1		1
C	1		

Table 4.1; Synopsis of the three schools' respondents

4.2 DATA ANALYSIS

The collected data was transcribed, coded, interpreted and the findings were written up according to a five step process. As mentioned in Chapter 3 the process suggested by Terre Blanche et al. (2006: 322 – 325) followed the following steps;

- Step 1 familiarisation and emersion
- Step 2 theme induction
- Step 3 coding
- Step 4 elaboration
- Step 5 interpretation, verifying and writing up

Further research concerns which have been gleaned from the findings are presented at the end of Chapter 5.

4.3 PRESENTATION OF DATA

In order to maintain anonymity the names of the schools and principals will not be made public. Schools will be known as School A, School B and School C and respondents will only be identified as Principal A, Principal B, Teacher B and Principal C.

The actual quotes captured from the personal interviews of the respondents are presented verbatim in this chapter. The system used to reference individual quotes in this chapter uses a capital letter i.e. A, B, C, to indicate each individual the school and a numeral that corresponds to the actual number of quotation as captured in the data.

4.3.1 Sample Schools

As described in Chapter 3, the three researched schools are located in the FET Band and although similarly tasked with educating learners up to NSC (matric) level there are fundamental differences between them. Teese and Polesel (2003:123), argue that there is a consistent difference between 'advantaged' schools and 'disadvantaged schools'.

Schools A and B can be typified as 'advantaged' schools which have material and symbolic advantages when facing the curriculum. These schools attract parents who are prepared to move, travel fair distances and even pay high school fees in order for their children to attend these particular schools as they have well trained teachers and offer a diverse curriculum including mathematics and physics (see Table 4.2) (Teese and Polesel 2003:197). Whereas, School C is an underfunded 'disadvantaged' school which serves the educational needs of a poor socio-economic community (C8). "In as much as we [School C] are in a township most of the learners that we are having, are coming from the informal settlement around the township which are the people which do not have good financial resources and that another problem is the learners we are teaching at school are the majority of them even if they are from the township they are mostly from the families that are disadvantaged" (sic) (C8) elaborated Principal C. Teese pointed out that it is not a cultural advantage that is pooled at these sites, but rather multiple disadvantages as there are high concentrations of learners who have poor [English] language skills (learners who are African first language speakers and are unable to converse fluently in English as their medium of instruction), fragmented family lives, experiencing poverty, low levels of parental education, a lack of facilities, leisure that is distracting rather than supportive of school who struggle with the curriculum (Teese and Polesel, 2003:123).

A difference in the type of schools researched emerged from the data, similar to what Teese and Polesel (2003) revealed in their research. It emerged that the

'advantaged' (urban) schools were perceived to be better resourced, well equipped and provided a higher level of education as compared to the deprived (township) schools. Those parents, who can afford to, are sending their children to the urban schools with the belief that their children would be getting a better quality of education through a high level academic curriculum. This has resulted in a drain of the more affluent learner from the township schools. Compared to the 'advantaged' schools, these township (disadvantaged) schools were left with an impoverished poorly educated parental body that are financially unable to provide assistance in supporting and resourcing the school sufficiently in order to offer a comparative subject choice. "Because of our curriculum [School C] not being fertile enough compared to the ex model C [referring to School B – a classification of specific schools by the previous South African Government] hence the parents of those learners who can afford financially they take those learners to those schools [Schools A & B] because of the resources they have, they are offering a better education than we have, and also because of the wide curriculum because the learners have got a wide scope of choosing what they want to do…the learners we are having in this school are from previously disadvantaged families financially"(sic) (C8). Furthermore, as the parental body are largely unaccustomed to being involved in educational matters they do not get involved in school affairs and therefore do not pressurise the schools on curriculum choices. Because of this the school curriculum choice is what would be most practical, with effective learning depending largely on the capacity of the teachers to make up for the gap between what the academic curriculum assumes about students and who students really are (Teese & Polesel, 2003:123). The low income of many black [township] South Africans is likely to restrict their access to better schools (Fiske & Ladd, 2005:54). Consequently, there is a chasm between the functional 'advantaged' schools and the struggling 'disadvantaged' schools.

4.3.2 Schools' Vision:

Each respondent subscribed to their individual school's vision as being the holistic development of the learner. Considering that South Africa needs young people to become useful citizens of the new democracy and learners skilled to work efficiently in new areas of the economy (South Africa, 2002; Gibson et al., 1997) the respondents see their role and the school's role, alongside parental input, as providing guidance and opportunities that will support learners to move upwardly in society through education. Principal A said that their school aspired to the "development of a learner not only academically but [toward] other sporting, and cultural activities", whilst Principal C added that ideally he would like "most of the learners [to] leave [their] school with some hands on experience [at least with having skills] in the critical subjects [areas]" (sic) (C6). Furthermore Principal A mentioned that "every learner who leaves this school hopefully in grade 12 will be able to pursue some form of tertiary education be it at a FET College of Education or at a university or technical college but also that they [learners] will they will be able to find some form of employment when they leave the school" (A3).

Although the schools are aspiring to get their learners to the same exit point of schooling namely in acquiring the National Senior Certificate (NSC) they are actually positioning their learners in different places. As indicated in 4.3.1, both 'advantaged' schools and 'disadvantaged' schools are taking learners of different social levels and providing them with a differentiated curriculum (Table 4.2) that focuses on attaining a school exit level. School A saw their responsibility as getting their learners into a position where they could go further to post-school studies by providing an academic curriculum, whereas, School C was focussed on the most probable employment opportunities for their learners as they were more inclined to offer a curriculum that they felt was most practical in getting their learners some form of employment.

4.3.3 Structure of School Subjects:

As described in Chapter 1 (1.2.3) all three schools have complied and are offering nationally approved FET subjects as specified in the National Curriculum Statement. The breakdown of the actual subjects offered by each school is indicated in Table 4.2. The three schools all offer the four compulsory (Group A) subjects and the same core of Group B elective subjects. In satisfying the requirements of their individual school community each school offers an additional selection of Group B elective subjects to their learners. The schools have packaged their subjects according to the FET organising fields of learning (South Africa 2005d: 23).

Although there is a differentiation in the different schools and their communities it can be gleaned from Table 4.2 that all three schools offer the four compulsory subjects and a selection of the NCS core subjects. Schools compiled their individual subject packages offerings from these core subjects (Table 4.2) taking into consideration the acceptable subjects that their learners would require for entry into Higher Education. However, School C has included additional utilitarian subjects such as Consumer Studies, Tourism and Agricultural Science. This school sees these additional subjects as being invaluable to those learners who would otherwise not qualify for further post school studies and would need to seek employment on completion of their schooling.

Table 4.2; Synopsis of school subjects.

School A	School B	School C
✓ Languages; English, first ; Additional language	✓ Language; English, first; Additional language	✓ Languages; Zulu, first; English secondary
✓ Mathematical Literacy	✓ Mathematical Literacy	✓ Mathematical Literacy
✓ Mathematics	✓ Mathematics	✓ Mathematics
✓ Life Orientation	✓ Life Orientation	✓ Life Orientation
• Accounting; Business Studies; Economics	• Accountancy; Business Economics	
• Geography; History	• Geography; History	• Geography; History;
• Information Technology	• Computer Applications Technology;	• Computer Application Technology;
• Life Sciences • Physical Science	• Life Science; • Physical Science	• Life Sciences; • Physical Science,
○ Consumer Studies		○ Consumer Studies; Tourism
○ Dramatic Arts	○ Drama Arts ○ Visual Arts	○ Agricultural Science
❖ Civil Technology	❖ Engineering Graphics & Design	❖ Engineering Graphics & Design

- ✓ Compulsory (Group A) subjects
- • Core of elective (Group B) subjects
- ○ Differentiated elective (Group B) subjects
- ❖ MET subjects (Group B)

4.3.4 Adoption of new FET Subjects into the School Curriculum.

As described in Chapter 2 the curriculum that is envisaged and planned through policy at a high level is not always that which can be enacted in the class room. Technology is one such subject that was ratified through the National Curriculum Statements (NCS) but has serious limitations when being implemented in the schools. The NCS specifies the learning outcomes, assessment criteria and subject content which are a National DoE curriculum enactment imperative. The schools on the other hand are faced with limitations in implementing the required curriculum as they are not getting the needed support structures as required by nature of the discipline. Principal C added that “before you introduce the new subjects for the new Curriculum Statement, you must consider certain facts. First one, you must check that you have got the human resources. Number two, you must check that you have got the physical resources in terms of apparatus you need or you have got to a plan and also the floor space because if you do not have those, obviously the introduction of a group will be difficult” (sic) (C30). These are some of the factors that will determine the introduction and successful implementation of new subjects.

The schools found they were following the historical path from whence they had come in adopting the new curriculum. The data revealed that essentially very little real change occurred in these schools as they were compelled to work within the constraints of their present human and infrastructural resources. They aligned themselves with the new FET curriculum, adopted the new subject name changes and implemented the individual subject curriculum changes as set out in the NCS documents. Schools were not in a position to introduce initiatives and bringing about any changes, as the DoE suggested that there would be no rationalisation in the adoption of the new FET curriculum as additional teachers and infrastructures were not available and indicated that they were not able to move teachers between schools on a large scale. Given these limitations the schools adapted the existing core subjects they were already offering, the available teaching staff they had for

these subjects and the physical resources they had available for teachers to teach in to satisfy the requirements of the new FET curriculum.

Principal B implied that no real change had occurred in the schools with the introduction of the new FET curriculum as they had continued in much same the way as they had operated in their historic past (B5). School A agreed that they had continued within their existing structure with little disruption and minimum change. Although, Principal A felt that it was an excellent idea (sic) “to offer Civil Technology, Electrical Technology and Mechanical Technology as such because that is going to have an impact on their learner’s lives in the future, more especially for employment and survival” (A8), unfortunately this could not be done at School A as they lacked the physical infrastructure to offer all three technological subjects. Furthermore they were experiencing extreme difficulty in employing suitably qualified teachers for the technological subjects that they were presently offering.

The schools were left very much to their own means to introduce the new curriculum. Principal B felt that as they were required to conform and follow the national strategies, they could not bring about any real change to the curriculum given the constraints and limitations of the school. As such, they didn’t consult parents; instead they worked with their academic staff in adopting the new subjects as they felt “the teachers are in the best position to [identify] where the needs lie in the school” (B9).

Conversely, School C decided to make use of this opportunity to obtain their parental opinion and utilise parental support to bring about change in their school. They opted for a consultative approach before implementing the new FET curriculum as they felt they needed the input of all the affected stakeholders so they, “consulted with the staff first and then we consulted with the governing body and then we consulted with the RCL [Representative Council of the Learners] which are at school, and then we engaged the parents“(C5) (sic). One of their objectives was to introduce FET Technology into their curriculum as they felt that as a school

subject it had the potential to fulfil a need. “Change in the schools and classrooms will have to be driven, albeit in the face of very scarce resources, by the people running those schools and classrooms” (Mason, 1999:140).

4.3.5 Elective Subjects offered to Learners.

Individual secondary schools developed their own subject combinations, which taken in conjunction with the compulsory subjects are offered as electives to be taken by the learners to the end of their schooling. These subject combinations or packages can comprise of either ‘high status’ or ‘low status’ subjects or a combination of such subjects (see Table 4.2), will position the school and ultimately determine the projected exit route of their learners. Learners can take up specific subject packages so as to fulfil their own aspirations on exiting school to enter the labour market or further their studies.

As described in Chapter 2 ‘high status’ subjects are those subjects that have a historic link to Higher Education and provide an entry gateway into Higher Education Institutions perceived to lead to higher levels of employment . ‘Low status’ subjects are those subjects that are made out to be sub-ordinate to the academic subjects, of lower value and more utilitarian in nature, thereby leading to lower levels of employment.

Principal B mentioned that learners at their school do aptitude tests in an attempt to get them to “see further than just a subject choice” (B20). They also have the services of a guidance counsellor who can assist in selecting pertinent and beneficial subjects as well as guide them in their post school future career choices. Although the individual schools offer different subject package combinations that are designed to be beneficial to the learner’s aspirations, “I think the children [learners] are quite often not very realistic in their choices” (B20) stated Principal B, inferring that at this stage of a learner’s life there are some learners who are not in a position to make such informed subject choices. They are unable to visualise their post

school needs. Whereas, others see the end of Grade 12 as being their terminal point of formal schooling and opt for the perceived easiest route through their secondary schooling. This invariably leads them to select 'soft' subjects toward attaining their NCS; inevitably without acquiring the essential specific subjects required for admission into tertiary education. Not having the benefit of a matric exemption or the required admission subjects to further post-school study could jeopardise the learner's employment opportunities to limited unskilled or semi-skilled types of jobs, accordingly positioning them at the lower end of the labour market with predictably a lower earning potential.

4.3.6 Perceptions of School Based Skills Subjects.

Worldwide a negative perception of manual vocational skilled based subjects in schools has developed. Amongst numerous issues this probable negative perception can be loosely attributed to changing of curricula in schools and the perceptions and attitudes that have subsequently developed over the years (Christie, 2008; Muller, 2006; Paechter, 2000; Goodson, 1993). Vocational subjects have been introduced into education systems and in many cases the ramification of executing them in the schools hasn't been fully understood, the necessary support has not been given nor the correct training of teachers offered, resulting in the vocational subjects being overshadowed by the more firmly established academic subjects. As the established subjects have developed more historical links to universities so have they become more dominant in schools curricula, elevating themselves onto a higher level and thus acquiring a 'high status', whereas conversely, vocational skills subjects which are perceived to be sub-ordinate to the established academic subjects and seen to be more utilitarian in nature are considered 'low status'. Unlike the established subjects which lead on to university admission, the 'low status' subjects invariably do not directly satisfy university entry requirements (South Africa, 2005e: 6).

Principal B pointed out that parents comments given to him seemed to indicate a perception that " if you have something with a label like Tech-no-logy immediately there is hundreds of years of mindset about Tech-no-logy so they [learners] come to this school wanting Aca- dem-ic ... all that baggage ... it is very real" (B25). Carnavan and Doughty (n.d.), in their research, argue that "use of the word 'technological' can be counter- productive in that it puts across little in terms of specific course content and is difficult to conceptualise within the wider usage of the word" (Carnavan & Doughty, n.d.; 93).

In conversations with the principle parents seemed to perceive Higher Institutions of learning to be socially uplifting and are idealistic in wanting their children " to go to a Higher Institute of learning, they do not want them to go to an FET College"(A 20; Alam, 2008). The research data found that in the 'advantaged' schools the "parent wants academics, wants academic, they do not want [their] children to be in a technical school, whether it is a stigma attached to it or inferior" (sic) (A26). There is a "a perception 'out there' that practical subjects doomed you to a kind of second class, or a less affluent future whereas academics was the route, was the key to all things good and wonderful and certain highly academic orientated careers, doctors, lawyers, accountants" (sic) (B 5: Dike, 2009; Alam, 2008). The historical perception that has developed over time has placed value on 'high status' academic subjects resulting in parents seeking out the 'advantaged' schools and being prepared to pay the higher price of education in order to fulfil the objective of their children being able to go onto Higher Education with the hope of acquiring higher profile jobs. Linked to national aspirations, it seems parents conveyed another perception that with a university qualification ones' developmental levels are higher which will lead to getting a higher salary job leading to an improved life style; which in a number of instances becomes the focus. Whereas, (although not documented), there are people in skilled manual employment, such as plumbers and builders for example, who are earning as much, if not more in some instances than a person with a degree and in all probability living a similar or better life style.

School C services a socio-economic class which comprises of working class parents employed in the unskilled and semi-skilled labour market who have a different perception and value of 'low' status subjects. They themselves have little education and being exposed to skills type employment they identify more easily with skills or practical related subjects. "the parents are in demand of technical subjects" (sic) (C13) revealed Principal C, "in fact the parents we are dealing with, when we introduced the technical subjects, they were very interested and felt it were the right way to do it" (sic) (C10). Learners aspiring to enter the skills sector of the job market after having done practical subjects at school have (sic) "got better [employment] opportunities because the subjects or the streams they are following fall under what we call critical [subjects] which is a need in the labour market" (C16), reiterated Principal C. A learner who has exposure to any of these types of subjects at school will benefit as they learn to utilize their subject knowledge and skills in the workplace.

Sometimes a learner may struggle with the academic curriculum and initiated by its teachers the school may suggest that technological subjects could be an easier alternate route for the individual learner to follow, a suggestion which could oppose the view and ideals held by parents (Alam, 2008), although not all learners have the "ability or interest to gain technological knowledge" (ibid, 2008:41). The perception held by academic staff that technological subjects are an easier alternate route to follow has possibly been created through sheer ignorance and a lack of knowledge of the technological subject curricula and the academic stringency and engagement required of such technological subjects. Commenting on this perception Principal B said "You hear it on our staff actually sometimes when some guy [learner] is struggling with a subject even the staff say you should really be doing something technical" (sic) (B72). Similarly School A sometimes suggests to parents that learners not coping with main stream academic subjects should consider moving their child to an FET College where they "would be better off using their hands" (A 10).

Learners however, sometimes provide a different contradictory perception and often pragmatic view of technological subjects to the one portrayed by their teachers. After giving an 'impassioned speech' (B6) in trying to enthuse Grade 9 learners on the opportunities technological subjects could give them when leaving school and upon entering tertiary education or toward future employment opportunities, Teacher B said disappointingly, "they [learners] would all break into an applause at the end of it, but they didn't chose the subject [as an elective for Grade 10]" (B6). Electronics was being offered at school B from the start of senior secondary schooling (Grade 10) and unlike other subjects, for example, Mathematics and Science; it doesn't have a follow through from compulsory schooling [GET] into secondary schooling [FET]. Teacher B also commented that "many [learners] started seeing electronics as just simply too difficult for them to handle and so my classes shrunk so we eventually just called it off" (B6). This suggests that the learners opted to follow traditional subject routes that they were familiar and comfortable with, rather than choose from a new range of new subjects which are different and like Electronics perceived to be too difficult. The lack of interest in engineering and technological subjects often manifests itself at school level at the age when curricular choices are made (Sjoberg, 2003: 3).

A past learner of School B found that technological studies was not only difficult but also required him to do 'academics' in order to fulfil the requirements of the qualification (B73). This contradicted the perceptions that his academic school teachers' had conveyed to those learners who were struggling with their academic subjects. The teachers had perceived technological disciplines to be an easy alternative to academic disciplines. According to Teacher B this past learner emphasised the stringent demands required by technological disciplines in saying "its [technical subjects] hard it's not easy. It is hard and I am still have to do Maths even though I'm doing woodwork, I still do Maths even though I'm doing woodwork, I still have to do maths" (sic) (B73). Furthermore, whilst talking with Teacher B this past learner said, "do not let those people back there [at School B] laugh at me when you say you found me here [FET College], I'm working very hard, it's actually

very tough" (B 73). This past pupils' statement emphasises that although technological disciplines may be perceived to be 'subordinate' relative to academic subjects, this is not necessarily so, as technological education involves a high degree of academic engagement. Not wanting to be laughed at, he alluded to peer perceptions and the possible stigma attached in choosing a technological path of study instead of an academic one. Not only are learners subtly influenced by parental and teacher pressure on selecting the 'correct' elective subjects they also experience peer pressure in being seen to be studying the 'right thing'.

All three school principals fore-grounded the positive outcome Technology as a subject can provide in acquiring knowledge and skills that can be utilised in opportunities of employment. As Principal A said "once the learners finish school to get involved in employment and also [become] employers themselves, where they can work with their hands in skills" (sic) (A6b). Principal B elaborated by saying "many of our [school] kids could go and should go and end up being better employed with more productive futures" (B5) had they had exposure to technological knowledge and skills. Whereas Principal C was concerned that not many of the learners in their [disadvantaged] school would be able to acquire a tertiary education, so in the interests of these learners their school would have liked them to pursue practical subjects as they were "interested in the development of skills so the learners can be marketable"(C3). Principal B also suggested that learners acquiring some form of practical skill could provide themselves with enhanced employment opportunities, a point supported by Principal C "most of the learners [in School C] when they pass their Grade 12 they are not employable any way because they are general [subjects studied] but if they pass Grade 12 with technical skills at least they can be employable or they can be self employed using the very same information we are saying skills knowledge that they have obtained" (sic) (C 36). Principal C alluded to the point that for many learners Grade 12 is their terminal point of education and they will exit school with only the subjects that they have studied in school which may not necessarily be beneficial in providing them with the desired employment opportunities that would elevate them socially whereas, had

they attained some form of skill at school they would have the potential to rise above their present social station.

4.3.7 Dearth of Technology Teachers

A major resource issue which is affecting the schools is the inability of being able to find suitably qualified teaching staff in Technology. Principal A fore-grounded the dilemma their school had in trying to get Technology teachers, “it was absolutely impossible to acquire the services of a teacher to teach Civil Technology and Mechanical Technology at the school once our HOD had requested medical boarding. I have advertised the post and none of the applicants, which were very, very few, not more than five, were suitably qualified to teach the subject. I was then forced to go and get a person who had taken early retirement and bring him back into teaching to teach the subject and that is the problem that we have”(A7a). Principal A’s school has already had to phase out Mechanical Technology classes (A14) and will be phasing out Civil Technology when the present cohort of learners leaves. As all FET subjects cover a three year term span, from Grade 10 to Grade 12 culminating in a NSC, it would be very disadvantageous for learners to enrol in Grade 10 and maybe have to change disciplines in Grade 11 as the school cannot continue with the Technology (A45) up to the end of Grade 12. Circumstantially therefore, School A is forced to follow a predominantly academic curriculum.

Teacher B confirmed the shortage of Technology teachers “with staffing problems that we have had [School B] we’ve had Art teachers teaching Technology, we have had Maths teachers teaching Technology, at the moment there is a CAT [Computer Applications Technology] teacher teaching Technology and the grade 8s doing Technology are taken by the Librarian”(B15). Teacher B in championing Technology in their school, went on to say proudly, “in fact I am regarded as the ‘fundi’ on Technology [in this school] and I have had no training on Technology as such” (B15).

Schools are less inclined to adopt Technology as a FET elective if they have to struggle to acquire suitably qualified staff to teach the subject. The schools are left with very little option but to pursue subjects that give the school an academic bias. Although academic subjects are also experiencing teacher shortages, teachers can still be acquired. Academic subjects invariably have solid structures in place and schools can confidently and reliably offer them to their learners without hiccups.

4.3.7.1 Audit of Technology Teachers

The scarcity of suitably qualified teachers to teach Technology at FET level is essentially a consequence of a number of issues.

No specific audit was done prior to the introduction of the new FET curriculum to ascertain firstly, the number of schools who might be or would be adopting FET Technology into their new school curriculum and secondly, the number of teachers that were available in the schools at the time of the inception of the new FET curriculum who could teach the Technology as a specialisation.

The National Scarce Skills List quantifies a scarcity of 24015 Further Education and Training teachers and trainers (South Africa, 2007: 14). As no breakdown was given in any specific subject area the actual shortage of Technology teachers cannot be given.

From the beginning of 2002 the numbers of national Teacher Training Colleges in South Africa was dramatically reduced. Only a few institutions were retained and subsequently incorporated into Higher Education Institutions. The rationalisation process caused an enormous drop in the number of teachers being trained countrywide as the Higher Education Institutions had to work within their own constraints in integrating these newly acquired institutions into their existing structures. In most cases this brought about a juxtaposition of different systems which needed to be ironed out. This situation initially created a void in the supply

and demand of newly qualified teachers which was also exacerbated by the time frame (time lag) needed to train students before they could qualify as trained teachers entering the teaching profession in schools.

4.3.7.2 Pre-service Technology Teacher Training

In South Africa the responsibility for initial teacher training has been shifted into Higher education. A 480 credit Bachelor of Education (B Ed) degree is recognised as a teacher education qualification that is required to teach in secondary schools. The undergraduate degree includes both the professional qualification and the subject specialisation. Specific subject specialisation at a particular phase level, such as Technology at FET level can be chosen as a student teachers major teaching area. This qualification provides good grounding for the teacher (Steyn & Mentz, 2008) in the knowledge, skills, values and principles of one of the specific Technology (Civil, Electrical or Mechanical) specialisations. On qualifying they are entitled to teach their Technology specialisation in Grades 10, 11 and 12.

The lack of newly trained specialist Technology teachers coming through the Higher Education Institutes can to some extent be attributed to some of the trainee teachers choosing Technology (which is normally generic Technology at GET level) as a 'filler' subject (B35) rather than choosing FET Technology as a specialist area discipline. As Teacher B pointed out "instead of the guy [student teacher] being trained as a teacher and his majors are Maths and this [another subject] and his Technology is an add-on, it should be Technology and maybe his Maths is an add-on" (sic) (B45). This scenario could be attributed to the way Higher Education Institutions have put together their subject permutations for the course. Another probability exists in that learners were not properly exposed to or had limited exposure to Technology during their initial school years resulting in them having little or no knowledge background in the subject. Being ignorant and unfamiliar with what Technology as a subject entails, has no doubt led students away from selecting Technology as their major teaching subject. In all probability repeating a scenario

similar to when they were required to select their secondary school [FET] subjects, where in all probability they favoured the more familiar subjects that they are comfortable with, such as, Languages, Mathematics, the Sciences or even Human Social Sciences. This knock-on effect has implications for schools requiring Technology teachers, as newly qualified teachers or even student teachers doing their WIL (Work Integrated Learning) cannot be fully utilised to teach Technology as the diverse nature of Technology requires a strong foundational knowledge and skills base. An inexperienced teacher without these required prerequisites to teach the subject will not do Technology justice.

As a lecturer involved in teacher training in a Higher Educational Institution I have noticed that a number of students who have chosen Technology as their area of teaching specialisation when registering for the B Ed FET under graduate degree have shown a tendency not to have any direct school based technical or technological subject knowledge background. Whereas for example, all the students who select Mathematics or Science as their major teaching specialisation must have as a minimum senior certificate pass in these subjects which provides an indication of their historical exposure to these subjects spanning the duration of their school years. It can be gleaned from Table 4.3 that few Technology student teachers have been exposed to technical or technological subjects. These few come with a shallow depth of knowledge as a result of probably having had limited exposure to technical or technological subjects for not more than the last three years of their senior secondary schooling.

Year Group	Number Students Registered	Mathematics / Science	School based Technical Subjects
2008	48	46	16
2009	34	34	10
2010	43	40	13

Table 4.3; Synopsis of FET Technology student teachers from 2008 – 2010

Some students take up Technology as an alternative teaching option to their first area of choice as they do not qualify for other teaching directions. They qualify for FET Technology on the grounds of having satisfied the admission requirements in having a Senior Certificate pass in Mathematics and Science. Age exemption rules are applied for those prospective students who do not have a Senior Certificate pass in Mathematics or Science.

I have also noticed that the merging of the antecedent technical subjects into the new subject Technology has diversified the new subject content by including each of the previous subjects' core content, resulting in the new FET Technology curriculum becoming inter-disciplinary, jumbled, unconnected and lacking in flow. For example, one section is about welding, the next section about automotive maintenance and another section about using machinery to make artefacts and so forth. Previously, students would study the subject content and acquire skills specific to that discipline. The new subject content expects students to acquire knowledge and skills across different technological disciplines. The ramification for the prospective Technology specialist student, who initially was not exposed to Technology and secondly, the nature of the new curriculum, necessitate that the student teacher must cover a far broader and greater depth of unfamiliar work to reach the same exit point of the

qualification when compared to other students that are familiar with the subject content in their elective disciplines all within the same teacher training programme. This can be very daunting for such students especially those without any prior exposure to Technology and who are now being exposed for the first time to completely new disciplinary knowledge and skills and simultaneously are also expected to grapple with unfamiliar terminology and jargon. It is nigh impossible to academically expose a student teacher to the full width and depth of the subject knowledge and skills when considering the students lack of technological background and given the time frame allocated by the qualification requirements. An apprentice for example, would be able to concentrate full time (all day, all year long) on being trained to specialise in a specific technical direction for the duration (normally three years) of their training period, whereas a student teacher is required to fragment their academic year into study time which is divided between their core, fundamental and elective subjects, examination time and vacation time. The actual exposure time of studying Technology as their major area of specialisation is diluted, effectively it is a fraction of the time an apprentice has available. However, although lacking strong disciplinary knowledge, students still manage to teach Technology in the schools during their experiential learning period. This doesn't do the subject full justice, although in many instances schools are accepting of the situation as it is a case of necessity due to the dire shortage of specialised Technology teachers.

4.3.7.3 In-Service Training

Although, the DoE has conducted in-service (INSET) training sessions to re-skill relevant teachers in Technology it seems that a very limited amount of this INSET training was done prior to the inception of the new curriculum. Post inception training has occurred through workshops and subject meetings, which according to Principal C are insufficient and inadequate, as "a two day [and /or] one week workshops is not enough" (C44) to train a teacher in a new subject area adequately and competently, which is confirmed by Engelbrecht, Ankiewicz and de Swardt (2006:2). Consequently, "teachers are not properly trained or skilled enough to

address the outcomes of Technology. They do not have the knowledge and skills of the subject and therefore lack the confidence to teach it" (B35) was pointed out by Teacher B.

This situation is reflected in the lower grades (GET) where some teachers from discontinued learning areas were given re-skilling training in Technology by the DoE. Although the DoE workshops attempt to train teachers to be competent on the content knowledge and the skills required to teach Technology, the diverse and complex nature of the subject can put off those teachers who feel incapable, not suitably equipped or not confident enough to teach it, to teach something that they are more familiar and comfortable rather than Technology, resulting in Technology "being diluted in the curriculum" (B 35; C44).

Consequently Technology lacks visibility as the lower grade teachers' lack of experience and knowledge impacts on the subject as a discipline which can have a further impact on the learners getting very little exposure to the subject and therefore not acquiring the expected knowledge, skills and insight into Technology. As a result, learners entering Grade 10 do not have a desire or an inclination to select Technology as one of their FET elective subjects. Teacher B commented that although Technology is compulsory at GET level, learners appear to know "very, very little, elementary stuff" (B41). The learners lack the basic skills, knowledge and principle values of Technology (sic) "that's where the whole thing [problem] is starting" (B41). This suggests that in effect the in-service training courses are counter- productive in as much as they are not re-skilling or providing the teachers with necessary required knowledge and skills to tackle Technology head-on and teach it competently.

The research data suggests that schools are less inclined to want to offer specialised FET Technology as a consequence of not having suitably qualified teachers and issues such as the lack of Departmental intervention and support for the subject. Consequently, Technology is not promoted and becomes less visible as

an elective subject to the learners when selecting their NSC subjects. The learners in turn will tend to opt for traditional subjects that they are more familiar and comfortable with. This situation results in a knock-on effect, with the learners not being aware of Technology as an optional choice consequently results in the class numbers dropping off, thereby giving the schools reason in justifying for discontinuing the subject.

The outcome of this situation is a diminished number of school leavers having Technology as a NSC pass, resulting in a fewer number of prospective student teachers that are likely to select Technology as their major area of teaching specialisation. This in turn can jeopardise the whole Technology teacher training programme. This 'merry-go-round effect', disturbingly indicates that the subject Technology is being circumstantially throttled thus creating a diminished need for the training of Technology teachers resulting in less Technology teachers entering the field and ultimately exacerbating the teacher shortage problem. Unless some corrective official interventional strategies are introduced, Technology will "have a slow and painful death in the schools" (A7) and become another "dead subject" (Hattingh and Killen, 2003:45).

4.3.8 Practical Component of Technology

Technology requires specialised machinery and equipment which needs to be kept abreast of the constantly changing nature of the discipline. Principal A said that Technology as a practical subject has prohibitively expensive requirements such as specialised machinery, equipment, resources, curriculum, personnel, support systems etc (A35; C30; Alam, 2008), which are not easy to meet without Departmental assistance. Principal A pointed out that all the high schools in the area where their school is located (A49) had previously been equipped with machinery and equipment to teach technological [technical] subjects "Every high school in this area was built with those resources ... were equipped with a skills department [Woodwork room, Metalwork Room, Technical Drawing Room] now we call it

Technology" (A51). Due to problems in acquiring properly skilled staff, these schools over time, have discontinued technological subjects in favour of an academic curriculum. School A is finding itself in the same situation and "the machinery that was given 27 years ago is still in good condition ... the Mechanical Technology we have dismantled it and [are going] to store it away" (A45). To re-equip schools with the required equipment, provide the physical infrastructure and to train and maintain the extra teachers that would be required would have a huge impact on the DoE financial resources (C 33). These schools have discovered that it far easier to find qualified staff to teach academic subjects than to find specialist subject teachers. By discontinuing these specialised subject in favour of academic subjects the schools are sending a message out to the community that 'high status' subjects have more value than 'low status' subjects and that they provide the pathway to employment whereas 'low status' subjects do not have the same value, which is contrary to the equity placed on all the elective FET subjects in the NCS. If this is a widespread phenomenon the schools could be perpetuating the skills shortage in South Africa as they are favouring the academically orientated (white collar) (C32) sector of the labour market and not giving the learners an alternate perspective of job opportunities in the skills sector. Principal C pointed out that (sic) "most of the learners [those that do not qualify for HE] when they pass Grade 12 they are not employable any way because they are general [referring to the type of subjects they have studied] but if they pass Grade 12 with technical skills at least they can be employable or they can be self employed" (C32).

The lack of physical resources, funding, materials and support hampered Principal C's attempt of introducing Technology as Principal C had introduced Electrical Technology in their school but had to discontinue the subject when the reality of such a subject dawned on them. "It was just that we [the school] had a misunderstanding and it was a bit emotional not understanding that we didn't have the funds because we tried to introduce Electrical Technology then two weeks [to] four weeks down the line I realised I am not coping then we [the school] called it off"

(C10). They found that they would need “R 247000 just to have one centre for Electrical Technology just [for] the resources that we need” (C23).

Principal C went on to explain that the ‘advantaged’ schools have better access to school fee revenue as they have a more affluent parental body that has different aspirations for their children and are thus prepared to pay high school fees, which puts them in a better position to off-set costs. Whereas, the ‘disadvantaged’ schools which are predominantly situated in low income communities consequently resulting in a low school fee revenue are finding that the practical type of subjects are uneconomically viable to offer as the ongoing upkeep, maintenance of machinery and equipment and the purchasing of student learning materials is prohibitively expensive (A 35; C10) which are costs they have difficulty in meeting. Providing good TVE [technological and vocational training] needs more “money for practical workshop facilities” (Alam, 2008:36). This point was emphasised by Principal A who said that with the relatively low learner numbers in these classes we “cannot have a large portion of the money [school fees] being spent on so few learners, it is not proportional” (A35) as it costs a lot to purchase materials for these learners projects.

4.3.9 Official support experienced by the Schools

The National Department of Education has identified the need for skills based subjects to complement the general academic subjects in the FET curriculum. Civil Technology, Electrical Technology and Mechanical Technology were included as nationally approved subjects that meet the requirements in the National Curriculum Statements for Grades 10 – 12 (South Africa, 2005d: 23).

All three respondents confirmed that there is a shortage of subject advisory services personnel (South Africa, 2007:14) as they have experienced very little if any intervention in the Pietermaritzburg region (A37; B54; C27). “We do not have any intervention from the Department of Education, there is no follow up with subject advisers” (A8) said Principal A. They felt that as there is only one subject advisor for

all the Technology subjects (B54) it is impossible for that one person to be an expert in each of the Technology subject areas (B54) and furthermore stressed that it is physically impossible for that one person to visit all the FET schools in the region.

Principal B mentioned that as their school was never visited by the departmental officials (B57) in all probability it could be deemed to be a functional school (as described in Chapter 3), in that it has the necessary infrastructure with the relevant academic staff and parental support structures in place. It is offering its learners academic subjects that articulate into tertiary education (see 4.3.2) (B4). Even though the 'disadvantaged' schools are situated in the poorer communities, they offer similar subjects to the 'advantaged' schools (see 4.3.2). These schools require to be visited more often by departmental officials as they do not experience the same level of support from their communities or have the same support structures in place as the 'advantaged' schools in that they are more likely to provide social support and tend not to focus on academic achievements (Christie; 2008:178) which suggests that 'disadvantaged ' schools are academically not as strong or have the same level of support structures in place as the 'advantaged' schools.

Both Principals A and C expressed a desire to have more Departmental intervention in the supply of physical resources (A37; C27) in their schools, for Principal A it was the need for teachers (A37) whereas for Principal C it was financial resources as the school doesn't have the financial means required to maintain equipment and also supply learners with learning materials (C10) as their parent body comes from a low income community and cannot afford to pay additional school fees (C8; C20).

The lack of Departmental support is having a negative impact on the schools as they are not able to offer the learners the opportunity of being able to select these subjects (A8). Furthermore, it was felt that the historical prejudices and preconceptions around practical and skills developmental school subjects are being reinforced through the lack lustre intervention by not fully supporting Technology.

4.3.10 Effect of Skills Shortages

The education system of every country is designed in one way or another to address the labour needs of that country. The National Department of Education in conjunction with the Department of Labour has identified through the *National Scarce Skills List* (South Africa, 2007) that there are too few skilled people especially with technical skills in South Africa. Technology was included in the FET curriculum to partly assist in addressing these issues and to provide career pathways and opportunities in the world of work (South Africa, 2005c).

The data revealed that there is a disjuncture between what was anticipated through the NCS and what is actually being enacted in the FET schools. As Principal B said "it is one thing to sit around a table and plan something, it is quite another thing to implement it" (B49) referring to the mismatch between the intentions and aspirations of the policy makers in enacting Technology as an elective subject in the South African FET curriculum through the NCS document and the constraints and limitations facing the schools at the implementation coal face. Much lip service has been paid to the skills shortage according to Principal A and "we [the schools] would expect some form of intervention" (A37) in actually endorsing, implementing and supporting Technology as a meaningful school subject that could contribute toward addressing the country wide issue and concerns surrounding the national skills shortages from a school perspective.

Naledi Pandor (2008) speaking in the National Assembly during the debate on her Education Budget vote reinforced the intentions of NCS when she mentioned that she intended to begin a process of renewal, expansion and modernisation for technical high schools as a "focussed investment in them could lead to a critical growth in technical and artisan skills needed" (Pandor; 2008).

Principal B pointed out that there are two things that can be done to address the skills shortage "one is to train people and the other is to spend money, so at the

moment the easier one is to spend money ... which is evidenced by the amount of money that is being channelled away from schools and into the FET College arena" (B50) instead of providing the much needed support that the FET schools require in endorsing Technology and developing it as a sustainable school subject.

The idea of creating a Centre of Technological Excellence where a move from the 'old economy ' focus on intellectual skills and manual skills to a radically new way of learning where diversified knowledge is disseminated providing a new way of learning in line with the global emphasis on knowledge society learners was posed by myself. Whilst this initiative can be applauded for its positive approach, it needs to be recognised as Principal C believes, "that the current economy of the country relies on skills" and that "we [South Africa] have a shortage of the people who are skilled enough to make the country rely on its human resources" (C11). "If the country is crying out for skills shortages ... haven't we got a responsibility as educational institutions to start trying to get kids [learners] channelled into something" (B17) reiterated Principal B. Whilst the idea was found to be acceptable (A18; C21), Principal A felt that parental prejudice (A18) would thwart such an idea. Principal B didn't visualise their school as being a Centre of Excellence (B 27) whereas Principal C mentioned that the implementation of such a project hinged on the availability and limitation of human and physical resources (C21).

CHAPTER 5: DISCUSSION, LIMITATIONS AND FURTHER RESEARCH

The focal point of Chapter 4 was presenting and analysing the collected data from Principals and Teachers of technology in their respective schools about their attitude and perceptions of the inclusion of Technology as a new subject, in the South African FET curriculum. Chapter 5 responds to the key questions of this research and presents the findings that were informed by the literature and the data.

5.1 FINDINGS

5.1.1 Technology and the School Curriculum

Technology which is a newly introduced subject in the South African education curriculum is mentioned by Rasinen (2003) in Chapter 1 as being part of the curriculum in many countries globally. The shared rationale which is common between countries is the need to prepare students to live in a rapidly changing technological world. Technology as a subject is called by different names in different countries and although it has a contextualised approach specific to each individual country its "universal goal is to help students to become technologically literate" (Rasinen, 2003:31).

In South Africa, the newly elected government of the new democracy in an attempt to redress the wrongs of the past reviewed both the country's education system and its curriculum. The compulsory education sector up to Grade 9 (GET) was firstly reviewed and restructured. Then Higher Education was rationalised and lastly, the further education sector (FET) from Grades 10 to 12 was reorganised.

The inception of the new FET curriculum structure saw the introduction of a much condensed curricula offering twenty nine academic and technological subjects. Today's world is constantly undergoing diverse technological changes, as a

phenomena which permeates all aspects of our daily lives, researchers such as Seiter (2009), Rasinen (2003), Sjoberg (2003) and Bybee (2000) maintain that a school curriculum should include Technology as a subject. On the pretext that man becomes an informed user of technology and understands technology in its various guises, three specialist Technology subjects are now included into the FET curriculum.

The data revealed that generic Technology is a compulsory school subject for all learners in the GET band, whereas, Technology in the FET band, which originated from the previous technical subjects, was diversified into three individual specialist technological subjects which learners could elect towards acquiring their NSC (matric certificate). Technology terminates at the end of formal schooling in Grade 12 and is not structured as an access route onto higher education (South Africa, 2005d: 23), unlike the Scottish curriculum for example, where Technology (referred to a Higher Technological Studies) emerges as a credible entrance qualification to higher engineering courses (Carnavan & Doughty, n.d.).

The respondents disclosed through the data, that although Technology is included in the intended national curriculum, its adoption and inclusion as part of the curriculum in the already established academic schools did not happen. After the inception of the new FET curriculum secondary schools continued with albeit modified versions of the existing subject structures that they had previously had in place. To minimise school, class and learner disruptions the schools closely correlated their existing individual subjects with the new NCS documents including instituting any new subject name changes. In most instances the schools haven't used this opportunity for change nor have they utilised their parental body when considering the introduction of new and 'foreign' subjects. The parental body had little or no input into changing the school curricula as most schools took it upon themselves to initiate the introduction of the new curriculum without parental input. The school's ethos which focuses on where it is academically taking the learners, presents specific

main stream academic subjects that can provide learners access to university. Technological subjects had been excluded from their previous curricula and consequently Technology was not considered as an additional elective subject. Technology, which is perceived to be a non academic subject, would have been asynchronous to the academic nature of the school had it been adopted which would have resulted in altering the schools' academic status quo. One of the participating schools had indicated that at the inception of the new FET curriculum it had attempted to include Technology in its curriculum, as it felt this subject could be beneficial to their learner body. However, they realised at an early stage, that they were not in a position to manage the far reaching implications of sustaining such a subject and subsequently disbanded their attempt. Consequently, they continued with their prior existing curriculum, offering those subjects which they could manage within their own limitations. Schools are thus finding themselves continuing with an easier comfortable route in continuing the main stream academic subjects, as structures are in place and resources and teachers for these subjects are more readily available, whereas acquiring technological resources and finding suitably qualified Technology teachers is becoming increasingly difficult. Those few schools that were offering technological subjects in their curriculum prior to the inception of the new curriculum in 2006 are finding it increasingly difficult to sustain Technology in their programmes. Dike (2009) revealed in his study that many of the technical and vocational schools are shifting their emphasis to training in computers and information technology.

As revealed above, the inclusion of Technology as a new FET subject during the execution of the intended curriculum in the academic schools did not happen at ground level in the real authentic school / learning environment. Schools have essentially continued with their academic curricula in much the same manner as they had been doing prior to 2006. This confirms that the wide gap in the curriculum (Drake, 2006; Rogan, 2004; Sethole, 2004; Jansen, 2001; Stenhouse, 1975) between introducing the goals of the planned curriculum in comparison with what

does in fact actually happen in the schools with the enacted curriculum as suggested by the literature and data is plausible.

5.1.2 Perceptions of Technology

The change in government has resulted in many low earning families that were previously relegated to living in townships now being able to acquire better jobs and move into the suburbs, developing a new upwardly mobile sector of society who has come to respect the importance of education. Many emergent middle-class black families have relocated into formerly all-white residential areas and moved their children from the township schools and enrolled them in city and suburban schools. These schools which were previously for the white communities only are perceived to offer a better quality and higher standard of education which satisfies the expectations parents have for their children. Parents now want their children to get a good education and through scholarly achievement attain professional jobs with high earning power.

Learners are required to select their post compulsory school subject combinations on exiting GET. The data revealed that at this stage of their school career most learners are not mature or responsible enough to make such decisions. They are generally unsure and indecisive about their futures, unless they have very focussed and fixed ideals on their future career paths. More often than not they need to rely on other sources for guidance, which could be a school guidance counsellor, teacher or their parents. The majority of secondary schools have subject combinations that comprise mainly of academic subjects. The literature and data shows that many learners are influenced by their parents when selecting their senior secondary subjects for NSC. They encourage their children to select academic subjects as these are perceived to be to their advantage either in progressing into higher education or beneficial in the work place (Alam, 2008). Prejudiced academic subject teachers also punt ‘high status’ academic subjects as technological subjects are seen to be for the learner who is academically challenged and destined for blue

collar employment. Technological subjects are often judged by historical prejudices and ignorance as being inferior or sub-ordinate to academic subjects which then relegates them into the lower category of subjects.

Learners from the less affluent or working class communities generally have very little or no parental support or assistance in selecting their subjects. In this instance the school has acted 'in loco parentis' and adopted subjects which they feel could be beneficial to their learners. They acknowledge that many of their learners would probably not be able to go onto post school studies and by exposing their learners to technological subjects they would be able to gain some technological knowledge and skills background before entering the labour market. Unfortunately without the necessary support and infrastructure this didn't happen.

The literature and data shows that even when technological subjects can be used for entry into Higher Education engineering courses, as is the case in Scotland (Carnavan & Doughty, n.d.), they are generally being overlooked as prospective subject options (South Africa, 2005e) in favour of the more traditional (Science) subjects and then only taken by a small number of learners (Young, 2006: 54).

A question arises as to what the impact on the Technology as a school subject would be, if it was given an appealing flamboyant name with more street appeal, such as 'Digital...' or 'Nano...'. Something that would grab the youth of today. Something that would attract the youth with its appropriateness to the requirements of the labour market and its potential link to higher earning opportunities? Could the subject experience an injection of fascination or interest? Would more learners take it up in the schools? Carnavan warns against only changing the name as it could be 'counter- productive' in not conveying the nature and intent of the subject thus making it difficult for [learners] to conceptualise (Carnavan & Doughty, n.d.).

5.1.3 Training of Technology Teachers

It became apparent from the data that the availability of properly trained teachers to teach Technology wasn't seriously considered prior to the implementation of the new curriculum and introduction of the new subjects into the schools. The data also revealed that schools had difficulty in finding suitably qualified Technology teachers.

5.1.3.1 In-service teacher training

The researched schools experienced a severe shortage of qualified teachers to teach Technology. They found that many of their teachers were ill-prepared for the inclusion of Technology into the revised curriculum. After attending in-service training workshops presented by the DoE, a number of teachers felt incompetent teach the subject. Furthermore, there is also an inadequate supply of new teachers trained specialist Technology teachers graduating from the Higher Education.

Many existing teachers were given the opportunity to be re-skilled and trained to teach Technology through short-term in-service training workshops conducted by the DoE. However, it would appear that these workshops were far too short in duration and counter- productive to their purpose. They were often found to be inadequate, ineffective and subsequently left teachers more confused about the subject. Consequently, after these courses teachers felt more ill-prepared and despondent about teaching Technology, resulting in them becoming de-motivated and less willing in wanting to teach such a diverse and complex subject.

5.1.3.2 Initial teacher training

Initial teacher training in Technology presently falls under the auspice of Higher Education. For Higher Education to sustain their initial teacher training programmes specialising in Technology requires continuous strong disciplinary developmental support from subject initiation at schools right through to programme implementation

in Higher Educational Institutions. The viability of producing successful Technology teachers is, firstly, dependant on the recognition of Technology as being a 'scarce learning area' (Pandor, 2005; South Africa, 1995) and secondly, reliant on the supply of suitable candidates emerging from the school system with a technologically grounded background.

The data disclosed that Technology lacks the required human, physical and financial support from the education and training bodies (see 4.3.9). It is a complex and expensive subject to run (A 35; C 30; Alam, 2008) which in addition to specifically trained human resources it also requires specific infrastructural resources (see 4.3.4). The data also revealed how the lack of support and resources has impacted on the researched schools. One school was unable to sustain Technology in their school curriculum and was subsequently forced to discontinue Technology classes in preference to academic subjects (see 4.3.7); whilst another of the researched schools was unable to initiate Technology and get classes off the ground (see 4.3.8).

Situations such as this create a knock–on effect. Discontinuing Technology as a subject in the senior secondary schools that were previously offering it results in more learners exiting schools without any background exposure to the subject composition of Technology. Consequently, fewer prospective student teachers with the necessary pre-requisites become available to train as specialists in FET Technology, as a result initial teacher training programmes at Higher Education institutions are not well subscribed and thus are not producing sufficient new FET Technology specialist teachers to satisfy the market demand. The impact of this is specifically felt in Kwa Zulu Natal where the initial training of specialist FET Technology teachers is being done by only one Higher Education Institution (Table 4.3).

With schools experiencing problems in trying to get suitably qualified teachers to teach Technology, one wonders about the feasibility of employing experienced

tradesmen (possibly the more ageing tradesmen) as teachers to teach the Technology subjects in their respective trade areas. As a short term initiative this intervention could go a long way in relieving the shortage of specifically skilled technological teachers until such time as the supply of trained teachers from the Higher Education Institutions start filtering through the system. The spin-off could have a number of benefits; firstly, highly skilled people with a wealth of experience are being captured from the labour market and absorbed by the school sector. Secondly, the schools can sustain the subject as they now have a teacher who is a specialist in their respective subject areas. Thirdly, the teacher shortfall situation is inadvertently being addressed. Fourthly, this initiative would provide employment opportunities for unemployed trades-people thereby reducing the fiscal burden on the social economy. Unfortunately there are a number of foreseeable limitations affecting this short term initiative. Firstly, it would probably be difficult to find these types of people when the economy is booming as most tradesmen would most likely remain 'working at the bench' which in all probability has a higher earning potential than teaching can offer, whereas, in harder times there would be a greater possibility of more trades-people being available. Secondly, although a large number of tradesmen, such as the older bricklayers and carpenters for example, have many years of 'hands on' work related experience they do not possess any relevant formal qualifications as many were denied the opportunity of post school education during the apartheid era and consequently resorted to 'learning on the job'. Unless some form of intervention strategy was applied, the lack of a formal 'paper' qualification in their relevant trade area would in all probability exclude them from a teaching post, as this a stringent prerequisite for employment in the teaching sector. Metcalfe expressed concern "that too much focus was placed on lecturers having theory-based, academic qualifications whilst people from industry were ignored (Parliamentary Monitoring Group, 2010:9).

In addition these trades-people would in all probability not have any teaching and classroom experience. Higher Education in collaboration with the DoE could be tasked with conducting an induction education programme to train these people (ex-

tradesmen) in the elementary skills of teaching. These courses could be advanced further so they could acquire a formal teaching qualification, such as the now defunct National Technical Teachers Diploma (Workshops) of the past.

5.1.4 Limitations of Technology in providing Skills

Specialised Technology subjects as laid out in the NCS have serious limitations in addressing the South African skills shortage. The nature and demand of many trades has changed over time. A number of the older occupations have disappeared and in some cases derivations of these have appeared in the labour market. Civil, Electrical and Mechanical Technology having been derived from a number of antecedent technical subjects, offer learners' specific elementary knowledge and skills relevant to each respective subject. Whilst the specific elementary skills are still pertinent, the Technology syllabi as such has not developed with time and kept abreast of the changes in the workplace. The very nature of most occupations has changed dramatically over time, which in many cases now demands a different set of skills. A motor mechanic of yesteryear needed broad generic related skills, whereas today for example, he would need to specialise in a certain area of a motor vehicle which now requires those skills that are relevant to only that specific area or he may need cross disciplinary skills such as using his mechanical skills in conjunction with electrical skills to repair the many electrical and electronic components of today's automobile. He may also need computer skills to work diagnostic equipment and machinery, administrative skills or even managerial skills. He no longer is a 'motor mechanic' but now becomes an 'automotive technician'. Today, many technologically derived occupations require an in-depth technological knowledge, a wealth of experience and a diverse high degree of skill which has resulted in them becoming highly specialised, precise and technically intricate. Furthermore, in many instances, the earning ability of numerous technicians has the potential to match some of the professional occupations.

The NCS limits the nature of specific skills that Technology offers at FET school level which discriminates against those learners wishing to follow a technologically based occupation. These persons would therefore need to acquire further advanced knowledge and skills training in their respective occupational areas at a post school institution such as a FET College.

This study has pointed to the disjuncture between the inclusion of Technology in the curriculum and drawbacks and shortcomings that have thwarted its adoption into an academic schools' curriculum.

5.2 NEW EDUCATION AND TRAINING DISPENSATION

As mentioned in section 2.3, the functions of education and training were dispersed across two national departments, namely, the DoE and DoL. The DoE through the respective provinces were responsible for providing education through formal institutions, whereas, DoL was responsible for skills development and training initiatives.

Following the appointment of the new state administration in 2009, the ministries of basic education and higher education and training were established. The Department of Basic Education (DBE) consists of compulsory schooling from Grade R to 9 and the FET schools from Grade 10 to 12. The Department of Higher Education and Training (DHET) deals with the whole field of training, this encompasses post-school education and training. The scope of the new DHET covers all public and private higher education institutions, FET colleges and skills development sectors (South Africa, 2011) which have been transferred from the DoL. All the sub-systems of post school education are now located together into one national department. This reform has "created improved co-ordination of the entire post –school system" (South Africa, 2010:13).

Of concern is the disjuncture between the DBE and DHET. I have been unable to ascertain a direct route of progression from the acquisition of technological knowledge and skills at FET school level from grade 10 to 12 (the subject of this study), which now falls within the ambit of DBE into post school education and training at either an FET college or university, which are within the mandate of DHET. According to minister Nzimande, “the DHET needs a rethink of the relationship between education and training in South Africa, in order for us to adequately prepare the youth for the labour market” (South Africa, 2010:8).

5.3 LIMITATIONS OF THE STUDY

Despite this study indicating the importance of exposing learners to technological knowledge and skills from not only an occupational perspective but also from a life-long learning point of view, it has limitations. These limitations lie largely in the size of the sample used. Cohen et al. (2001:93) and Patton (2002: 244) say there are no rules for sample size in qualitative inquiry. Sample size depends on what you want to know, the purpose of the inquiry, what is at stake, what will be useful, what will have credibility, and what can be done with the available time and resources (de Vos, 2005:328). According to Patton (2002), sampling for qualitative evaluation requires selection of information rich cases.

I would have liked to have had more respondents to interview as the small number of school participants interviewed limited the generalisability of these finding. The nature of the research topic limited the number of respondents to the principals from each school and to only one teacher who dealt exclusively with technological subjects. Other staff members were omitted from the study as they dealt in particular with their own individual academic subject disciplines.

Furthermore, although some studies have been done on Technology at GET level no studies could be found that focussed on Technology at FET level in the South African context, making it difficult to find specific contextual information. The very

few studies that had been done on Technical education in the previous National Government education system were outdated and irrelevant to the present study and in most instances not readily available to source.

5.4 SUGGESTED FURTHER RESEARCH

From the conducted research the following points were identified as possible areas for further research:

- Other researchers could reaffirm this research from a broader aspect. They could look at it from a wider school grouping, across the teachers teaching the subject, other provinces' schools and parental perceptions and attitudes or even from the DoE perspective.

- Investigations could be conducted to explore how to change the perception of Technology that it comes to be regarded as an academic 'high status' subject so that learners could use it to articulate into Higher Education studies, taking cognisance of the implications of omitting Technology from the designated subject list as a recognised subject for entry into higher education (South Africa, 2005e: 6).

- Explorations could look at how learners can be motivated to continue studying Technology in the FET band considering factors such as;
  * marketing
  * career guidance
  * articulation between school, further education and the work environments.
  * changing nature of Technology from manual to digital, for example.

- The green paper (South Africa. 1998:7) states that; "different FET programmes and qualifications are poorly articulated, inhibiting student

mobility and leading to high levels of inefficiency". The disparity between academic and technological programmes and qualifications could be interrogated with an understanding gleaned on progression into higher education and ultimately the labour market.

5.5 CONCLUSION

In responding to the key research questions the findings from the data and literature revealed that Technology was introduced as a new subject into the National Curriculum, however, it was not accepted as a school subject in the academic curriculum of the FET secondary schools. Furthermore, this research confirms that the historical preconceptions and prejudice against technological subjects still exist. Technological subjects are perceived to be sub-ordinate to academic subjects even though there is global consensus that society needs to be technologically literate.

On the whole the DoE is sending out a negative message about Technology, albeit unintentionally, as being an irrelevant subject by not promoting, supporting and accentuate its trajectory from inception in the RNCS through to implementation in the FET secondary schools and on to Higher Education. As indicated in the data, the DoE hasn't been prepared to go the extra mile and make exceptions by putting additional strategies in place nor have they provided any additional incentives to introduce the new subject into the schools. The lack of planning, inadequate number of trained teachers and the minimalistic support and assistance given by the grossly insufficient number of subject advisors to the existing schools indicates very little acknowledgement from the DoE in maintaining Technology as a sustainable school subject.

While it can be acknowledged that Technology has an invaluable part to play in society, its image needs to be uplifted through the national Department of Education embracing it and enthusiastically promoting the significant role of Technology as a school subject through the Provincial Departments of Education. This could be done

by emphasising the relevance of developing learner's elementary technological knowledge and skill for the labour market. Additionally, interventional strategies need to be put into place to align its outcomes and syllabi with present day occupational needs. Partnerships between the DoE, DoL, business and industry need to be formed and in collaboration Technology must be promoted to make it more attractive as an occupational option.

Society and the school community must be educated on understanding the constructive role technological knowledge and skills can impart to our youth. Until there has been a mind-shift, which will take a long time to do, the difficulties of overcoming the historic prejudices and negative perceptions held by sectors of society will impact on Technology being recognised and treated as being on par with traditional academic school subjects.

It is widely acknowledged that any country is widely reliant on a technologically skilled workforce that can contribute towards its economy. Higher Education in collaboration with relevant education and training authorities needs to recognise the significance of Technology within the South African education and economic context.

My responsibility in Higher Education is to specifically train student teachers to specialise in Technology so they can teach this discipline in senior secondary schools and enthuse them as newly qualified teachers to impart their technological knowledge and skills to their learners. Learners in turn, can utilise their technological knowledge and skills and acquire relevant employment opportunities. Utilising a cascade model through the national school network system, relevant educational bodies can assist Higher Education with their tasked responsibility of teacher education and training by encouraging and motivating learners to take up Technology as a senior secondary school study subject.

In cascading technological knowledge and skills from the lecturers in Higher Education to the newly trained teachers and then down to the learners in the classrooms more people are being exposed to Technology. This gives broader and wider exposure to Technology as a discipline, potentially resulting in more learners being stimulated and attracted to the teaching Technology, which would bolster the present low number of learners entering the Technology teacher training programme.

Without high level support Higher Education cannot fulfil its responsibility to produce the much needed trained and qualified Technology teachers for the FET schools. Failing this, Technology will become just another “dead subject” (Hattingh & Killen, 2003:45).

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ADDENDUMS

Addendum A: UKZN Ethical Clearance

RESEARCH OFFICE (GOVAN MBEKI CENTRE)
WESTVILLE CAMPUS
TELEPHONE NO.: 031 – 2603587
EMAIL : ximbap@ukzn.ac.za

23 MARCH 2007

MR. RF HOLMES (875873250)
EDUCATION

Dear Mr. Holmes

ETHICAL CLEARANCE APPROVAL NUMBER: HSS/0102/07M

I wish to confirm that ethical clearance has been granted for the following project:

"Investigating the introduction of the new FET Technology Curriculum: A study of three senior secondary schools in Pietermaritzburg"

Yours faithfully

MS. PHUMELELE XIMBA
RESEARCH OFFICE

cc. Faculty Research Office (Derek Buchler)
cc. Supervisor (Ms. R Searle)

2007 -03- 27

Addendum B: KZN DoE Permission to Conduct Research

PROVINCE OF KWAZULU-NATAL
ISIFUNDAZWE SAKWAZULU-NATALI
PROVINSIE KWAZULU-NATAL

DEPARTMENT OF EDUCATION
UMNYANGO WEMFUNDO
DEPARTEMENT VAN ONDERWYS

Tel: 033 341 8611
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INHLOKOHHOVISI | PIETERMARITZBURG | HEAD OFFICE

Enquiries: Imibuzo: M Francis Navrae:
Reference: Inkomba: 0006/07 Verwysing:
Date: Usuku: Datum: 08/05/2007

RE: PERMISSION TO CONDUCT RESEARCH

TO WHOM IT MAY CONCERN

This is to serve as a notice that RF Holmes has been granted permission to conduct research with the following terms and conditions:

- That as a researcher, he/she must present a copy of the written permission from the Department to the Head of the Institution concerned before any research may be undertaken at a departmental institution.
- Attached is the list of schools she/he has been granted permission to conduct research in. however, it must be noted that the schools are not obligated to participate in the research if it is not a KZNDoE project.
- **RF Holmes** has been granted special permission to conduct his/her research during official contact times, as it is believed that their presence would not interrupt education programmes. Should education programmes be interrupted, he/she must, therefore, conduct his/her research during nonofficial contact times.
- No school is expected to participate in the research during the fourth school term, as this is the critical period for schools to focus on their exams.

for SUPERINTENDENT GENERAL
KwaZulu Natal Department of Education

HSS/0102/07M

87587250

Addendum C: Informed Consent

28 May 2008

Informed consent toward proposed research study

Dear Sir,

I am currently undertaking a research study toward my Master in Education qualification. My research topic is,

"Investigating the introduction of the new FET Technology Curriculum. A study of three senior secondary schools in Pietermaritzburg"

As a lecturer in higher education, involved with the training of teachers in the specialised field of Technology for the FET band, I am particularly interested in finding out how the new FET Technology subjects are perceived in high schools. This data could impact on the training of FET Technology teachers, an area in which I am involved.

Participants have been randomly selected from schools across Pietermaritzburg that are co -educational and have a representative spread of learners. It is estimated that approximately an hour to an hour and a half will be required where participants will respond to an interview.

Confidentiality and anonymity of participants is assured as data collected is for the sole use of the researcher of this research project. All data will be kept securely locked away and will be disposed of after a reasonable period after the completion of this project.

Participation in this study is purely voluntary and participants are at liberty to withdraw at any stage or for any reason should they so desire.

Permission for this research project has been granted by the KZN Department of Education.

For further clarity you may contact;

Mrs Ruth Searle (UKZN; Supervisor; 033 260 6250 or searle@ ukzn.ac.za)
Ray Holmes (Researcher; 033 845 8923 or rayh@dut.ac.za)

Your participation would be greatly appreciated.

R Holmes

.....

Please complete the following declaration;

I, …….....
(Full names of participant) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participating in the research project.

I understand that I am at liberty to withdraw from the project at any time, should I so desire.

SIGNATURE OF PARTICIPANT: ……..

DATE: ……

Addendum D: Interview Schedule

Interview Schedule for Technology

1. Which FET learning fields has your school aligned itself with?

2. How does your school group these FET subjects?

3. How did your school choose these subjects? Where would you place Technology?

4. What do you think this school sees its educational purpose as being?

5. With the debate around skills shortages and the inclusion of Technology into the curriculum, do you see this effecting the schools practice and/or the way it sees its mission or purpose

6. How does the need for life skills and lifelong learning impact on the learner's choice of FET subjects?

7. How do students respond to having Technology at GET?

8. Have any learners requested Technology as part of their electives when choosing their FET subject package? Numbers / percentages?

9. How has your school accommodated this request?

10. How do you feel about the idea of schools being Technology Centres of Excellence?

11. Would your school be in a position to offer Technology if the learners requested it? Could it become a centre of excellence?

12. Why do you think some FET schools have chosen to include Technology as a subject and others have not?

13. Why do you think the National Department of Education has included Technology as part of the FET subject frame-work?

14. Why do you think the Provincial Department of Education has chosen not to place more emphasis on Technology as a subject in light of the national skill shortage?

Addendum E: Interview Transcriptions, CD included