

**A study of Technology Education Instructional Practices in  
Grade nine Classrooms: A Case Study of Three Senior  
Secondary Schools in the King William's Town District.**

by

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Submitted in fulfillment of the requirements for the degree of

**MASTER OF EDUCATION**

in the

**Faculty of Education**

at the

**UNIVERSITY OF FORT HARE**

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**January 2012**

# DECLARATION

I, Lulama Princess Ntshaba, declare that this dissertation which I hereby submit for the Degree of Master of Education in the Faculty of Education at the University of Fort Hare, is my own work and has not been submitted by me for a degree at this or any other tertiary education institution.

I also declare that as far as I am aware, all references used in this dissertation have been cited and acknowledged.

.....

.....

Lulama Princess Ntshaba

Date

## **DEDICATION**

This study is dedicated to my late mom, Kholiwe Maureen Ntshaba. This, I know, would have made you proud.

# **ACKNOWLEDGEMENTS**

I wish to acknowledge all the people who gave me their support and guidance during the time I conducted this study.

- 1) Firstly, I would like to thank my supervisor, Dr Xoliswa Mtose, for her knowledge and ability to make me look at things more in-depth. The completion of the research would not have been possible without her invaluable guidance, support and advice.
- 2) My gratitude also goes to the Faculty of Education Academics, Drs Stunky Duku and Namhla Sotuku for their constant support and encouragement during the journey.
- 3) I am also grateful to my children Nodumo, Chulumanco and Xolisa for always being patient with my constant absence due to the strain that the commitment to this project may have put on our family life. Thank you for your patience.
- 4) Sincere appreciation to my everlasting friend, Vuyani Dyalo who has been inspiring me throughout my studies. Without his constant encouragements and motivations, I would have not been gone so far.
- 5) My deepest gratitude also goes to teacher participants who were so willing to take part in this research, spending their time to make this process a success.
- 6) Last, but not least, The Almighty God whose Blessed Assurance keeps me breathing and still gives direction to all my endeavours.

# **ABSTRACT**

The purpose of this study is to investigate teaching and learning practices in Grade nine Technology Education classrooms. However, this is to ensure the relationship between the existing Technology Education teaching and learning practices and the Revised National Curriculum Statement (RNCS) requirements. The study was conducted in three King William's Town Senior Secondary schools. The research took the form of a qualitative interpretive case study focusing on a study sample of three Technology Education teacher participants. The qualitative methods used allowed the researcher to gather the data in order to describe and interpret teachers' Technology Education instructional practices in Grade nine classrooms. The data was gathered by the observation of Technology Education lessons in the classrooms, through the interviews, as well as the examination of the learning area policy documents (mainly the lesson plans and the activities in the classrooms).

In contrast to the past traditional curriculum, the outcomes-based RNCS proposes that teachers teach for understanding and concept development with emphasis on active learning, problem solving, reasoning and communicating technologically. To achieve the outcomes of the RNCS, teachers who are regarded as the "key contributors to the transformation of education in South Africa" need to be "qualified, competent, dedicated, caring and be able to fulfill the various roles outlined in the Norms and Standards for educators" (Department of Education, 2002a, p.9).

It has been evident by the researcher that instructional practices are not aligned with curriculum expectations. The findings revealed two fundamental reasons for this, namely the teachers' understanding of the RNCS is limited and teachers' lack of confidence with regard to content knowledge for Technology Education teaching. Teacher competence relates to teachers having the content knowledge and the ability to use this knowledge pedagogically to ensure that the curriculum is thoroughly covered at all levels. It has been recommended in this study that teacher development needs to become a priority. It is vital, that programmes are developed to retrain Grade nine Technology Education teachers in-service.

## **ACRONYMS**

|        |                                                                |
|--------|----------------------------------------------------------------|
| AS     | Assessment Standard                                            |
| CK     | Content Knowledge                                              |
| CAPS   | Curriculum and Assessment Policy Statement                     |
| DoE    | Department of Education                                        |
| DST    | Department of Science and Technology                           |
| ECDoE  | Eastern Cape Department of Education                           |
| FET    | Further Education and Training                                 |
| GET    | General Education and Training                                 |
| HOD    | Head of Department                                             |
| ITEA   | Internal Technology Education Association                      |
| LO     | Learning Outcome                                               |
| LOLT   | Language Of Learning and Teaching                              |
| OBE    | Out-comes Based Education                                      |
| PCK    | Pedagogical Content Knowledge                                  |
| RNCS   | Revised National Curriculum Statement                          |
| SNP    | School Nutrition Programme                                     |
| SSTD   | Senior Secondary Teachers Diploma                              |
| SAQA   | South African Qualifications Act                               |
| SAASTA | South African Agency for Science and Technology<br>Advancement |

# TABLE OF CONTENTS

| CONTENT                                                                        | PAGES |
|--------------------------------------------------------------------------------|-------|
| <b>CHAPTER ONE: BACKGROUND OF THE STUDY</b>                                    |       |
| 1.1 INTRODUCTION.....                                                          | 1     |
| 1.2 BACKGROUND OF THE STUDY.....                                               | 2     |
| 1.2.1 An overview of the Curriculum and Assessment Policy Statement (CAPS).... | 2     |
| 1.2.2 The researcher's experiences with teachers of Technology Education.....  | 4     |
| 1.2.3 The concept "technology": An International perspective.....              | 8     |
| 1.2.4 The concept "technology": A South African perspective.....               | 9     |
| 1.2.5 Goals and scope of Technology Education.....                             | 10    |
| 1.3 STATEMENT OF THE RESEARCH PROBLEM.....                                     | 16    |
| 1.4 RESEARCH QUESTIONS.....                                                    | 17    |
| 1.4.1 Main Research Question.....                                              | 17    |
| 1.4.2 Sub-questions.....                                                       | 17    |
| 1.5 PURPOSE OF THE STUDY.....                                                  | 17    |
| 1.6 OBJECTIVES OF THIS UNDERTAKING.....                                        | 18    |
| 1.7 ASSUMPTIONS OF THE STUDY.....                                              | 18    |
| 1.8 SIGNIFICANCE OF THE STUDY.....                                             | 18    |
| 1.9 RATIONALE OF THE STUDY.....                                                | 19    |
| 1.10 DELIMITATION OF THE STUDY.....                                            | 20    |
| 1.11 LIMITATIONS OF THE STUDY.....                                             | 20    |
| 1.12 DEFINITIONS OF KEY CONCEPTS.....                                          | 21    |
| 1.13 THESIS CHAPTER OVERVIEW.....                                              | 23    |
| 1.14 SUMMARY.....                                                              | 25    |
| <b>CHAPTER TWO: LITERATURE REVIEW</b>                                          |       |
| 2.1 INTRODUCTION.....                                                          | 26    |
| 2.2 AN OVERVIEW OF THE REVISED NATIONAL CURRICULUM                             |       |

|                                                                                                      |    |
|------------------------------------------------------------------------------------------------------|----|
| STATEMENT (RNCS) .....                                                                               | 27 |
| 2.2.1 Outcomes- Based Education (OBE).....                                                           | 27 |
| 2.2.2 The kind of teacher that is envisaged by the Revised National Curriculum Statement (RNCS)..... | 30 |
| 2.3 THEORETICAL FRAMEWORK.....                                                                       | 32 |
| 2.3.1 Content Knowledge.....                                                                         | 33 |
| 2.3.2 Pedagogical Knowledge.....                                                                     | 35 |
| 2.3.3 Technology Knowledge.....                                                                      | 36 |
| 2.4 TEACHING STRATEGIES IN TECHNOLOGY EDUCATION CLASSROOM.....                                       | 39 |
| 2.5 TEACHING AND LEARNING RESOURCES IN TECHNOLOGY EDUCATION CLASSROOM.....                           | 44 |
| 2.6 TEACHER PERCEPTIONS FOR MEANINGFUL TECHNOLOGY EDUCATION TEACHING.....                            | 46 |
| 2.6.1 Technology.....                                                                                | 47 |
| 2.6.2 Technology Education.....                                                                      | 48 |
| 2.6.3 Technology as a Learning Area.....                                                             | 48 |
| 2.6.4 How Educational Technology differs from Technology Education.....                              | 49 |
| 2.6.5 Technology Literacy.....                                                                       | 49 |
| 2.7 TECHNOLOGY EDUCATION TEACHER CHALLENGES.....                                                     | 49 |
| 2.8 SUMMARY OF THE LITERATURE REVIEWED.....                                                          | 51 |

## **CHAPTER THREE: RESEARCH DESIGN AND METHODOLOGY**

|                                                  |    |
|--------------------------------------------------|----|
| 3.1 INTRODUCTION.....                            | 53 |
| 3.2 RESEARCH APPROACH: QUALITATIVE APPROACH..... | 55 |
| 3.3 RESEARCH PARADIGM.....                       | 59 |
| 3.3.1 Interpretative Paradigm.....               | 59 |
| 3.4 RESEARCH DESIGN.....                         | 60 |
| 3.4.1 A Case Study Design.....                   | 61 |

|                                                              |    |
|--------------------------------------------------------------|----|
| 3.5 DATA COLLECTION PROCEDURE.....                           | 64 |
| 3.5.1 Semi-Structured Interviews.....                        | 65 |
| 3.5.1.1 Advantages of the semi-structured interviews.....    | 66 |
| 3.5.1.2 Disadvantages of the semi-structured interviews..... | 67 |
| 3.5.2 Direct Classroom Observations.....                     | 67 |
| 3.5.2.1 The advantages of the classroom observations.....    | 68 |
| 3.5.2.2 The disadvantages of the classroom observations..... | 68 |
| 3.5.3 Document Analysis.....                                 | 69 |
| 3.6 DESCRIPTION OF THE POPULATION UNDER STUDY.....           | 70 |
| 3.7 SAMPLE AND SAMPLING.....                                 | 71 |
| 3.8 NEGOTIATING ENTRY INTO THE RESEARCH SITE.....            | 72 |
| 3.9 DATA ANALYSIS PROCESS .....                              | 73 |
| 3.9.1 Main study.....                                        | 74 |
| 3.10 DATA ANALYSIS.....                                      | 77 |
| 3.10.1 Analysis of data from the interviews.....             | 78 |
| 3.10.2 Analysing data from the classroom observations.....   | 78 |
| 3.10.3 Analyzing data from the documentary analysis.....     | 79 |
| 3.11 TRUSTWORTHINESS.....                                    | 80 |
| 3.12 VALIDITY AND RELIABILITY.....                           | 81 |
| 3.12.1 Validity.....                                         | 81 |
| 3.12.2 Reliability.....                                      | 82 |
| 3.13 ETHICAL CONSIDERATIONS.....                             | 82 |
| 3.13.1 Anonymity and confidentiality.....                    | 84 |
| 3.13.2 Informed consent.....                                 | 84 |
| 3.14 SUMMARY OF THE CHAPTER.....                             | 85 |

## **CHAPTER 4: THE PRESENTATION, THE ANALYSIS AND THE INTERPRETATION OF THE DATA**

|                                                            |     |
|------------------------------------------------------------|-----|
| 4.1 INTRODUCTION.....                                      | 86  |
| 4.2 THE ANALYSIS OF THE DATA.....                          | 87  |
| 4.2.1 Coding of Data.....                                  | 88  |
| 4.2.1.1 Coding the Teaching Practice.....                  | 89  |
| 4.3 PRESENTATION OF DATA.....                              | 91  |
| 4.3.1 Demographics.....                                    | 91  |
| 4.3.2 Demographic Characteristics of the participants..... | 92  |
| 4.3.3 Teacher Profiles .....                               | 95  |
| 4.3.3.1 Participant A- PA.....                             | 95  |
| 4.3.3.2 Participant B- PB.....                             | 96  |
| 4.3.3.3 Participant C- RC.....                             | 97  |
| 4.4 PRESENTATION AND ANALYSIS OF RESEARCH DATA.....        | 98  |
| 4.4.1 Research question one.....                           | 98  |
| 4.4.1.1 Participant A .....                                | 98  |
| 4.4.1.2 Participant B.....                                 | 102 |
| 4.4.1.3 Participant C.....                                 | 104 |
| 4.4.2 Research Question two.....                           | 109 |
| 4.4.3 Research Question three.....                         | 119 |
| 4.5 THE INTERPRETATION OF THE FINDINGS.....                | 126 |
| 4.5.1 The teachers' views of Technology Education.....     | 126 |
| 4.5.2 Perceptions of Teaching.....                         | 129 |
| 4.6 SUMMARY OF FINDINGS.....                               | 135 |
| 4.7 CONCLUSION.....                                        | 137 |

## CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

|                                                                                                      |     |
|------------------------------------------------------------------------------------------------------|-----|
| 5.1 INTRODUCTION.....                                                                                | 138 |
| 5.2 SUMMARY.....                                                                                     | 139 |
| 5.3 RECOMMENDATIONS.....                                                                             | 145 |
| 5.3.1 Recommendations to Technology Education teachers for Developing<br>Programs for Practice ..... | 145 |
| 5.3.2 Recommendations for Practicing Teachers.....                                                   | 147 |
| 5.3.3 Recommendations for Curricular Support.....                                                    | 148 |
| 5.3.4 Recommendations for future Research.....                                                       | 150 |
| 5.4 LIMITATIONS.....                                                                                 | 150 |
| 6. LIST OF REFERENCES.....                                                                           | 152 |
| 7. APPENDICES.....                                                                                   | 162 |
| 7.1 APPENDIX A: District Letter.....                                                                 | 162 |
| 7.2 APPENDIX B: Letter to schools.....                                                               | 163 |
| 7.3 APPENDIX C: Consent Form.....                                                                    | 164 |
| 7.4 APPENDIX D: Observation schedule.....                                                            | 165 |
| 7.5 APPENDIX E: Semi-Structured Interviews.....                                                      | 166 |

## LIST OF TABLES

|                                                                                      |     |
|--------------------------------------------------------------------------------------|-----|
| <b>Table 4.1</b> Category description of actions and pertinent lesson features ..... | 89  |
| <b>Table 4.2</b> The demographic characteristics of the participant .....            | 92  |
| <b>Table 4.3</b> Levels of classroom interaction .....                               | 124 |

## LIST OF FIGURES

|                                                                                        |    |
|----------------------------------------------------------------------------------------|----|
| <b>Figure 2.1</b> The Two Circles Representing Pedagogical and Content Knowledge ..... | 36 |
| <b>Figure 2.2</b> The Two Circles of Pedagogical Knowledge and Content Knowledge ..... |    |

|                                                                                 |    |
|---------------------------------------------------------------------------------|----|
| are now joined by Pedagogical- Content Knowledge .....                          | 36 |
| <b>Figure 2.3</b> The three circles represent Pedagogy, Content, and Technology |    |
| Knowledge .....                                                                 | 37 |
| <b>Figure 2.4</b> Pedagogical Technological Content Knowledge .....             | 37 |

# **CHAPTER ONE**

## **BACKGROUND OF THE STUDY**

---

### **1.1 INTRODUCTION**

This study describes the instructional practices of Grade nine Technology Education teachers applied to facilitate Technology Education learning. The teachers' practices are described in relation to the requirements of the Revised National Curriculum Statement.

This chapter presents and discusses the background and the rationale of the study. The chapter briefly outlines the research problem as well as the research questions. It further explains the purpose, the aim and the objectives of the research. Furthermore, it expatiates more on the definition of Technology Education as a Learning Area/subject in the existing curriculum system as well as the significance of the study. The key concepts have also been defined and the delimitations of the study explained. As Grade nine Technology Education teachers seem to be struggling with teaching the Learning Area/subject, it was imperative, therefore, to find out more about the instructional practices that they use in their teaching and learning. The chapter is concluded with a brief summary. The background of the study is first outlined.

## **1.2 BACKGROUND OF THE STUDY**

### **1.2.1 An overview of the Curriculum and Assessment Policy Statement (CAPS).**

The study is conducted during the transitional period, when the existing curriculum, Revised National Curriculum Statement (RNCS) is being changed into Curriculum and Assessment Policy Statement (CAPS). Its brief was to identify the challenges and pressure points that impacted negatively on the quality of teaching in schools and to propose mechanisms that could address these" (Curriculum News, 2011, p.4). Motshekga (2011, p.7) emphasized the fact that Curriculum and Assessment Policy Statement is being used as a starting point for filling in gaps, reducing repetition and clarifying where necessary, for example learning area has been changed into subject, Learning Outcomes and Assessment Standards are no longer there but reworked into general aims of the South African curriculum and specific aims of each subject. In the intermediate phase (Grades four-six), Natural Science and Technology are merged into one subject. Eight learning Areas for Intermediate phase have been identified as overload to both teachers and learners and therefore Life Orientation and Arts and Culture are merged into one subject as well. The intention to merge Natural Science and Technology is to build a concrete foundation for Grades seven-nine as the Natural Science discipline is applied to Technology. This means that not everything from the existing curriculum is to be thrown away but to reflect and reduce the challenging factors or aspects in order to simplify, improve and strengthen the mechanism.

The researcher therefore aimed at reviewing the existing curriculum with the intention to identify what is still relevant from the existing curriculum as well as the reasons for the

challenges experienced by the Technology Education subject so that they can be resolved. The outputs could be useful for the success of the new curriculum system.

This study is based on Technology Education Instructional Practices in Grade nine classrooms, and therefore the researcher is still unable to base her study on CAPS as it has not yet been implemented in Grade nine as well as the Grade nine teachers not yet been trained in this education system. The implementation plan for Grades four- nine or Intermediate phase to senior phase as well as Grade 11 will be in 2013 and the Technology Education teachers will be trained in 2012.

Fortunately enough, the new curriculum system plans to resuscitate and strengthen the significance of the content in Technology Education by introducing the four required content knowledge namely, structures, processing, mechanical and electrical systems and control followed by practical work in which the knowledge is applied. In all cases, the teaching will be structured using the Design Process as the backbone for the methodology, still emphasizing innovation, invention, creativity and critical thinking as key factors. The intention is to introduce learners to the basics needed to Civil Technology, Mechanical Technology, Electrical Technology and Engineering Graphics and Design introduced in Further Education and Training (FET). This will provide Technology Education learners with some experience to help them with some career oriented subject choices at the end of Grade nine. (CAPS, 2011, P.3-4).

The significance of teaching the content and skills through the Mini Practical Activity Tasks (Mini-PAT) based on design process (investigation skills, making skills, evaluation skills and communication skills) is being emphasized in CAPS, having 30% (content based test) and 70% (Mini- PAT) on term basis. The final examinations comprise 40% Continuous Assessment (CASS) and final examinations comprise 20% Mini-PAT and 40% towards the final examinations of 100% (Curriculum and Assessment Policy Statement, 2011, p.30). The researcher therefore decided to use some of the concepts in the study where necessary.

### **1.2.2 The researcher's experiences with teachers of Technology Education**

The researcher's interaction with Technology teachers took place when she served as a subject advisor in the King William's Town district. This position triggered her curiosity to find out more about the instructional practices that the teachers are expected to use in implementing effective teaching and learning in this learning area/subject. One of the researcher's responsibilities in that capacity was to train teachers in this regard, and to monitor and support them. It was expected of her to compile evaluation reports on teacher performance or progress at their schools, based on what they gained from the training for the benefit of learner performance, on a monthly basis.

During subject workshops and school on-site monitoring and support visits, the researcher observed that Technology teachers seemed to be unable to interact with classroom activities based on Technology Education as a practical learning area/subject. Most of them had been teaching traditional technical subjects, therefore they appeared to be not well capacitated with Technology Education content

knowledge, and technology related skills. They generally lacked effective instructional practices as Technology Education is referred to as an integrated learning area/subject that calls for an integrated approach. Their Technology Education classrooms seemed lacking appropriate resources as well as unable to improvise them. That had reflected the fact that they were also lacking Indigenous Knowledge Systems that could make them come up with the much needed possible short term solutions to the current challenges in Technology Education as a province. In the light of the above observations, the researcher deemed it imperative to find out the instructional practices that the Grade nine Technology Education teachers use, and to understand the alignment of the practices with the Revised National Curriculum Statement (RNCS).

The Revised National Curriculum Statement (RNCS) proposes a different approach to what most South African teachers and learners have experienced in their classrooms in the past. The previous South African curriculum or 'syllabus' as it was called, was "Euro-centred, authoritarian, prescriptive and context-blind" Jansen, cited in (Ramsuran & Malcolm, 2005, p.518) and emphasized content procedural knowledge. The RNCS heralded a profound shift in curriculum policy, advocating outcomes-based philosophies, learner-centred integration classroom learning experiences of knowledge, skills, values and attitudes. The educational reforms in South Africa have been framed by an Outcomes-Based Education (OBE) policy. Outcomes- Based Education forms the foundation of the curriculum of South Africa (Department of Education, 2002b, p.1). One of the assumptions underlying this nationally directed educational reform process is that

teachers will be both willing and able to adapt their teaching and assessment practices accordingly.

Outcomes-Based Education (OBE) was adopted as the approach that would enable the implementation of the existing curriculum. According to Spady (1994, p.1), Outcomes-Based Education means clearly focusing on and organizing everything in an educational system around what is essential for all students to be able to do successfully at the end of their learning experience. This means starting with a clear picture of what is important for the students to be able to do, then organizing the curriculum, instruction, and assessment to make sure this learning ultimately happens (*Ibid*). The OBE framework defines the knowledge, competencies, attitudes and values which learners in different areas should acquire, develop and demonstrate. In the South African OBE system, there are different kinds of outcomes:

- **Critical and Developmental Outcomes:** The Critical and Developmental Outcomes are a list of outcomes that are derived from the constitution of South Africa and are contained in the South African Qualifications Act (SAQA) (1995). They described the kind of citizen the Education and Training system should aim to create (Department of Education, 2002a, p.11).
- **Learning Area Outcomes:** These are broad cross-curricular outcomes which are statements of intent giving direction and guidance to more specific outcomes. OBE fosters a more holistic approach, where integration of learning content is emphasized. In order to facilitate integration, the existing

curriculum is developed on the basis of learning areas. Each learning area has its own specific outcomes.

- **Assessment Standards** are other elements which play an important role in the RNCS. These refer to specific knowledge, attitude, proficiency and competencies which should be demonstrated in the context of a particular learning area. It tells teachers how deep, how complex and how far to go with the content. It is not intended to prescribe to teachers as to what to teach, but rather to assist them. They give teachers much more detailed information as to what learners should know and be able to do in order to show achievement. They also provide teachers with levels to be reached in the process of achieving the outcome. The outcomes and assessment standards “emphasize participatory, learner-centred and activity-based education” (Department of Education, 2002a, p.12). The RNCS policy document further states that the Learning Outcomes and the Assessment Standards “leave considerable room for creativity and innovation on the part of teachers interpreting what and how they teach” (*Ibid*)

An important feature of OBE is that all learners are expected to succeed (Spady & Marshall, 1991). This places tremendous responsibility on the teacher to be creative and innovative in their teaching to develop means in order for all learners to be successful. According to the Department of Education (2002a, p.12), Outcomes-Based Education (OBE) in South Africa “is intended to ensure that all learners are able to

develop and achieve to their maximum ability and are equipped for lifelong learning". One way of doing this is by fostering different teaching and learning styles.

Scrutiny of the Critical and Developmental Outcomes as well as the Learning Outcomes and Assessment Standards for Technology Education in Grade nine reveals that in the past learners were introduced to Technical subjects as passive receivers, now they are expected to be engaged in the activities. This has been supported by Bishop, (1988, p.191) when reinforcing this ideology by using Mathematical perspective, "Mathematical enculturation"

The kind of teachers envisaged by the RNCS is "teachers who are qualified, competent, dedicated and caring" (Department of Education, 2002a, p.3). Teachers are seen as the "key contributors to the transformation of education in South Africa" (Department of Education, 2002a, p.3).

### **1.2.3 The concept "technology": an international perspective**

New Zealand Ministry of Education (cited by Smit, 2007) defines technology as a creative, purposeful activity aimed at meeting needs and opportunities through the development of products, systems or modifying environments. On the other hand, Internal Technology Education Association (ITEA) (2001, cited by Heymans, 2007) defined technology as how people modify the natural world to suit their own purposes. It is explained that the terminology itself is derived from the Greek word "techne," which refers to art or artifice or craft. In that sense, technology literally means the act of making or crafting, but more generally it refers to the diverse collection of processes

and knowledge that people use to extend human abilities in the quest to satisfy human needs and wants.

#### **1.2.4 The concept “Technology”: A South African perspective**

Technology Education is one of the learning areas, referred as subjects in the Curriculum and Assessment Policy Statement (CAPS), that were introduced to all South Africa’s GET Band schools when the existing curriculum was introduced after 1994. Prior 1994, traditional technical subjects namely, Home Economics, Woodwork, Metalwork, and Industrial Arts were neatly packaged into self contained subjects, whereas Technology Education embraces various subject areas. (Engelbrecht, Ankiewicz and De Swardt, 2007). Smit (2007) explains that Technology is part of our daily lives and is getting entwined in what people do everyday. Humankind becomes more dependent on Technology, but do not always understand what it encompasses or entails.

Technology therefore is defined as the use of knowledge, skills and resources to meet people’s needs and wants by developing practical solutions to problems, while at the same time taking social and environmental factors into consideration (Department of Education, 2002b). It is therefore, a learning area/ subject which in implementation is integrated easily across other learning areas. It cannot be separated into content and process, or theory and practice Williams (2000, p.1, cited by Heymans, 2007). Smit (2007) explains that Technology is part of our daily lives and is getting more entwined in what people do every day. Humankind becomes more dependent on Technology, but

do not always understand what Technology encompasses or entails. It is therefore understandable that Technology ought to be a compulsory part in any school curriculum.

### **1.2.5 Goals and scope of Technology Education**

Dugger and Johnson (1992) cited in Smit (2007) suggested that one of the goals of Technology was to impart skills to learners. This would in turn provide them with opportunities for employment. Technology, therefore, is defined as the use of knowledge, skills and resources to meet people's needs and wants by developing practical solutions to problems, while at the same time taking social and environmental factors into consideration (Department of Education, 2002a).

Heymans (2007, p.18) has pointed out that Technology involves everything around us and the way that people use available assets, knowledge and skills, through different processes, to develop our world and to be able to satisfy our needs and wants. In exploring Technology Education, learners do often develop an understanding of the progress and scope of Technology through exploratory experiences. In group and individual activities, learners will experience ways in which technological knowledge and processes contribute towards effective designs and solutions to what may sometimes seem as insurmountable technological problems.

The Department of Education (2002a, p.4) in the Revised National Curriculum Statement, cited by Smit, (2007, p.9) 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. Some of these solutions have been in the form of products (e.g. shaping bones into fishhooks and needles, making clay cooking pots), while some solutions have involved combining products into working systems. (e.g. bow and arrow, moving water and a wheel, pestle and a mortar). 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 a 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 (Ibid).

For a society deeply dependent on technology, particularly in this knowledge age, people are largely ignorant about technological concepts and processes, and the factors that underpin technological development and innovation. In the past they have neglected Technology Education and this has led to a society that generally knows little about technology and engineering, and thus has little understanding of the potential of technology.

In the past, 'doing' (know how) has been undervalued in our technology education system and in many cases 'knowing' (know what and know why) has proven to be unhelpful. Technology education seeks to move beyond the divisions between theory and practice, and integrate these categories that have been historically separated in

education. Such integration serves to enhance students', and ultimately society's, level of technological literacy and allows students to contribute to and critique these technological developments from an informed position.

Technology is a living and dynamic subject, which requires positive interaction between schools and their communities. Projects carried out in the local community provide win-win benefits for both schools and project sponsors. The willingness of technological professionals to participate is vital. Existing schemes are run by the voluntary efforts of a small number of enthusiasts, and are vulnerable to the loss of key individuals (Smit, 2007). Simao (2008) has been supported by Morris (2000) when arguing that implementation remains far from a living reality because the education policy is a result of the convergence of planned and unplanned factors rather than a holistic new exercise in rational planning and problem solving.

Sternhouse (1975, cited by Kelly, 1999) supported the above argument by stating that the planned curriculum might be different from the received one in the sense that teachers sometimes, make what they offer appear more attractive than it really is. Furthermore, he continues, curriculum studies must ultimately be concerned with relationship between these two views of the curriculum, between intention and reality, and indeed, closing the gap between them, if it is to succeed in linking the theory and the practice of the curriculum.

There exists mutual development and reinforcement between curriculum and teacher competence. Congruence between curriculum change and teacher development is important for effectiveness of teaching and learning (Yin Cheong Cheng, 1994). Cheng further argues that a curriculum is effective if it can interact appropriately with teachers' competence to facilitate teacher performance, help students gain learning experiences which fit their characteristics, and produce expected educational outcomes. Furthermore, Curriculum development or change aims to maximize the effectiveness of teaching and learning through change in planned content, activities and arrangements for educational processes.

Given the nature of the reform efforts along with national goals for student achievement in mathematics and science, there is no doubt that as a country in a new era where educators in mathematics, science, and technology must find ways to join forces to meet the curricular challenge before them (Morris, 2000). The consistent message heard across the disciplines emphasizes the need to collaborate, integrate, focus on literacy, facilitate inquiry and problem solving, and provide educational experiences that are of value to all students. To enable teachers to provide an integrated teaching and learning environment, changes in teacher preparation are essential (Berlin & White, 2007).

Technology, as a compulsory learning area/subject along Mathematics and other subjects in South Africa, requires purposive activity in the design and representation of artifacts, and can provide a valuable context for thinking about and using geometric

concepts. In particular, the way the learners represent an artifact in the form of drawings reflects the way the learners interpret the artifact itself. This study planned to increase and encourage the integration of Mathematics with Technology and other learning areas as suggested by the National Curriculum Statement (Department of Education, 2003a) cited by (Brijlall, Maharaj, Jojo, 2006). This stands to reason that the integration of Technology with Mathematics prepares our learners for Mathematics, Science and Technology related careers that could pave the way for a better future.

Technology Education provides the opportunity for learners to take part in design activities and to understand how internal constraints and processes affect designs. Brainstorming, visualizing, modeling, constructing, testing and refining designs provide firsthand opportunities for learners to understand the uses and impacts of innovation. Learners develop skills in communicating design information and reporting results (Department of Education, 2002b, p.5)

It is further explained that this learning area also provides the foundation for future studies. Through this study, it is anticipated that the study of technological issues would not give learners correct answers but allow them to develop skills in asking critical questions, understanding alternative viewpoints and their origins.

Allsop and Woolnough (1990) explain that technology has developed along four different lines, each with its own traditions and characteristics. The first approach has been dominated by craft teachers, the second approach focuses on hi-tech advances

(computers & electronics) while the third presents technology as an engineering course at secondary level and the fourth views technology as a 'subject of science'. Science teachers therefore are expected to play an important role, when implementing CAPS, by teaching technology as an applied science, modifying and extending the science curriculum to involve design and the completion of an investigational or constructional project.

This prescribes therefore that Technology is more than a content learning area/subject. It is practical and requires a hand on approach. Teachers teaching the learning area/subject are required to change their traditional instructional practices in order to achieve the set purpose of teaching the learning area/subject. For example, teachers are required to provide learners in Technology Education classrooms with opportunities to work in groups to analyze information in order to create practical solutions. By the end of Grade nine, which is an exit point of compulsory education, they are expected to produce self dependant learners who can join the world of work, equip them with skills and knowledge to generate creative and innovative ideas, and to co-operate in translating them into action (Department of Education, 2005b, p.5).

The above mentioned expectations cannot be fulfilled if our teachers are not well capacitated with the full background of the subject. This study endeavours to investigate teacher practices in Grade nine classrooms in the King William's Town schools. This research is about the process of policy appropriation and misappropriation by agents mediating between policy and its actual practice in the classroom. In this case, the

policy in question is the RNCS policy. The mediators between the policy and practices in the classroom are teachers. This study aims to ask, "What is going on in the teaching of Technology Education in the Grade nine classrooms"?

### **1.3 STATEMENT OF THE RESEARCH PROBLEM**

Technology Education is a learning area/subject which in implementation is integrated easily across other learning areas/subject. It cannot be separated into content and process, or theory and practice (Heymans, 2007). The main concern is whether the teaching practices of Grade nine teachers are aligned to the Revised National Curriculum Statement (RNCS) requirements, particularly pertaining to the teaching and learning of Grade nine Technology Education learning area/subject. Technology Education is the integration of theory and practice, aims at involving learners in the application of Maths and Science disciplines into practical activities (Department of Education, 2002b).

However, Technology Education learners are expected to conduct the practical activities using available and relevant resources. The learning area/subject provides learners in Technology Education classrooms with opportunities to work in groups to create practical solutions that in return produce self dependent learners who can join the world of work. Furthermore, learners equipped with knowledge and skills to generate innovative and inventive ideas, having no limited exposure to open-ended questions, practical approaches or reflective practice that are promoted by RNCS. This study, therefore, seeks to investigate the practices that are being employed in Grade nine to facilitate Technology Education learning in the classrooms.

## **1.4 RESEARCH QUESTIONS**

### **1.4.1 Main Research Question**

The main research question that guides this research is:

What do Grade nine Technology Education teachers in the King William's Town schools do to facilitate Technology Education?

### **1.4.2 Sub-questions**

1. What practices in Technology Education and technological activity are prevalent among Grade nine teachers.
2. What are the practices of teaching Technology Education that would best facilitate Technology Education learning in Grade nine.
3. What teaching strategies are employed by these Grade nine teachers in their classrooms?

## **1.5 PURPOSE OF THE STUDY**

The purpose of this study was mainly to investigate Technology Education teaching and learning practices in Grade nine classrooms. Central to this study was to investigate the relationship between the existing classroom practices of Technology Education teaching and the Revised National Curriculum requirements. Furthermore, the research is to describe the current Grade nine Technology Education instructional practices. The researcher assumed that a constructive and meaningful description of current Technology Education instructional practices forms the basis of offering reasonable suggestions that might improve the pedagogical content knowledge employed by Technology Education teachers. The fact that this study is being conducted during the

transitional period of changing the existing curriculum into Curriculum and Assessment Policy Statement (CAPS), the assumption is to benefit from the research results.

## **1.6 OBJECTIVES OF THIS UNDERTAKING**

The main objective of this study is to investigate teaching and learning practices in Grade nine Technology Education classrooms. However, this is to ensure the relationship between the existing Technology Education teaching and learning practices and the Revised National Curriculum Statement requirements. The researcher assumes that the appropriate integration between the two aspects will lead to effective classroom practices.

## **1.7 ASSUMPTIONS OF THE STUDY**

This study assumes that if Technology Education teachers embrace the principles and requirements of the NCS and incorporate them within their instructional program and practices, learners' technological achievement will increase.

## **1.8 SIGNIFICANCE OF THE STUDY**

The findings of this study would make a significant contribution in ensuring that Grade nine Technology Education teachers know and understand the conceptual knowledge and skills as well as their pedagogical experiences within Technology Education instructional practices. It is assumed that the pedagogical content knowledge gained by Technology teachers would be cascaded to both teachers and learners in order to improve teacher learner performance in the Learning Area/subject. It is assumed that relevant use of Technology Education Instructional practices could lead to quality

teaching and learning of Technology Education as the learning area/subject promotes an integrated approach.

Furthermore, this would possibly provide Education officials a better insight into some of Technology Education teaching practices. This might ultimately lead to the growth of teacher development programmes that could be targeted and crafted in such a way as to try to eliminate some challenges on teaching practices.

## **1.9 RATIONALE OF THE STUDY**

Technology is one of the subjects that were designed to uplift the economy of the country (Department of Education, 2002b, p.1). Therefore, one of the General Education and Training (GET) education policies is for Technology teachers to produce learners that are able to find solutions to real life challenges, expanding more on their skills development expertise. Grade nine learners, being the exit point for GET band, do not reflect any capabilities of skills development that could take them further for their initial stages in work places (Department of Education, 2002b, p.1).

The researcher's concern was to know and understand the reason for this expectation not to be fulfilled. As a Subject Advisor in this Learning Area/subject for a number of years, the researcher observed that Technology Education teachers were struggling in unpacking the most relevant Technology Education Instructional practices namely, case study (reflecting problem scenario), design processes (investigation, design, making, evaluation and communication) that are promoting teacher and learner activity involvement. That had triggered the researchers' curiosity to find out more about these

teaching and learning practices the Grade nine Technology teachers implement in teaching the Learning Area/subject.

It is assumed, therefore, that Technology Education Instructional practices could be the reason for learners not to be fit enough to reflect what is expected of them to show and be able to do in work places.

### **1.10 DELIMITATION OF THE STUDY**

The study was conducted in three senior secondary schools in the King William's Town education district. The participants were the Grade nine Technology Education teachers. The researcher examined teachers' instructional practices in the teaching and learning of Technology Education in the Grade nine classrooms.

### **1.11 LIMITATIONS OF THE STUDY**

The study is conducted during the transitional period, when the RNCS is transformed to CAPS. The researcher will be unable to explore some of the areas of concern based on Technology Education Instructional Practices in Grade nine classrooms as the Curriculum and Assessment Policy Statement Grade nine has not yet been implemented.

A possible limitation envisaged was that it was difficult for the researcher to collect the expected data within a stipulated time as she dealt with three selected schools, one school per circuit, in a vast district of King William's Town. The transcripts of the lessons were the most difficult part in data collection as it was time-consuming in that each and every part of the lesson was to be transcribed. The National Industrial strike had

restricted the time taken by the researcher in collecting the data. Sometimes the challenges encountered included the failure to read the lips of the learners from the videotape, especially that there was a power failure that caused the audio-visual not to be heard and seen clearly. According to the researcher's plan, the transcription period was meant to take a week after the acquisition of the videotaped lessons. However, the process took two weeks and three days.

### **1.12 DEFINITIONS OF KEY CONCEPTS**

A number of concepts relevant for this research have been defined in this section. These concepts are as follows

**Investigation** - To inquire more knowledge and understanding about certain aspects, mainly through the application of the research skills so as to reach a solution to a problem.

**Instructional Practice** - In this study, the term instructional practice is used to mean everything that teachers do in order to support the learners in their learning. The learners are being involved in the most important features of the lesson, namely key Technology Education ideas, the quality of explanations, the provision of high quality tasks, how Technology Education is taught, hands on materials, as part of instructional practice.

**Outcomes-Based Education (OBE)** - In this study the Outcomes means the contextually demonstrated end products of the learning process in Technology

Education. However, Outcomes-Based Education (OBE) was adopted as the approach that would enable the implementation of the C2005 curriculum as well as to present the Revised National Curriculum Statement (RNCS). “Outcomes-Based Education is therefore referred as the foundation of the curriculum of South Africa” (Department of Education, 2002b, p.1).

**Revised National Curriculum Statement (RNCS)** - The revision of C2005 resulted in a draft Revised National Curriculum Statement (RNCS). This document was subsequently further revised. A streamlined and strengthened C2005 is now called the Revised National Curriculum Statement (RNCS).

**Pedagogy** - In attempting to develop a definition of pedagogy, the researcher refers to Simon (1987, p.371), who stated that: “Pedagogy is a more complex and extensive term than “teaching”, referring to the integration in practice of particular curriculum content and design, classroom strategies and techniques, a time and space for the practice of those strategies and techniques, and evaluation purposes and methods. All of these aspects of educational practice come together in the realities of what happens in classrooms”.

**Teaching strategies** - In this study, teaching strategies are the actions or activities carried out by the teacher in a structured way so that an output could be achieved.

**Technology education** - Technology education can be seen as a comprehensive-based educational programme that allows learners to investigate and experience the means by which people meet their needs and wants, solve problems and extend their capabilities (Pudi, 2002).

**Grade nine Technology teachers** - These are the educators entrusted with teaching the subject at the mentioned grade in schools.

**Implementation** - This refers to the accomplishment of the teaching of Technology Education in the context of this presentation.

### **1.13 THESIS CHAPTER OVERVIEW**

The thesis has been presented in the following chapters whose outline is provided below:

#### **Chapter One: Introduction**

This chapter outlines the general overview of the study by providing the introduction, the background as well as the rational for the study. It further provides the research problems, the research questions, the purpose of the study, delimitations, limitations, definition of concepts as well as the summary of the chapter.

#### **Chapter Two: Literature Review**

Chapter two presents the conceptual framework and related literature with regards to Technology Education teaching and learning instructional practices. In this chapter,

theories and findings from other writers are considered with the intention to reinforce the researcher's arguments.

### **Chapter Three: Research Methodology**

This chapter describes the research design and methods in depth as well as how the process took place. This chapter gives an account of the research paradigm, the research methods and designs adopted, including data collection and data processing. Finally, the chapter concludes with the presentation of the measures to ensure trustworthiness, ethical considerations as well as anonymity/confidentiality.

### **Chapter Four: The Presentation, Analysis and Interpretation of the Data**

This chapter presents analyses and discusses findings in accordance with the research questions. In this chapter, the researcher drew on the data gathered using instruments as explained in chapter three to describe the teachers' instructional practices. The summary of the main results of the study is reflected as well.

### **Chapter Five: Summary, Conclusion and Recommendations**

In the final chapter, the key findings of the study are described in relation to the theories discussed in the literature reviewed in chapter two. The implications of the results are then discussed and summarized. The significance as well as the limitations of the research is presented. The chapter ends by citing further possibilities for developing, as well as the recommendations for further research in this area.

### **1.13 SUMMARY**

This chapter has given an introductory background as well as the rational of the study. This was followed by the problem statement, the research questions, the aims and the objectives of the study. The purpose and the delimitation of the study have been outlined as well as the explanation of the key concepts. Chapter two will report on the theoretical framework and the literature review on the Technology strategies implemented by the Grade 9 Technology Educators. The following chapter, chapter two reviews the literature that supports this study.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

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#### **2.1 INTRODUCTION**

The aim of this chapter is to provide an overview of relevant literature concerning Technology Education instructional practices in Grade nine classrooms (Fleish, 2008, p.121) points to the “classroom as the major source of the crisis in primary education”. This study is about the process of policy implementation within teaching and learning practices by the Grade nine teachers. In this case, the policy in question is the Revised National Curriculum Statement (RNCS).

This research investigates the relationship between existing practices of Grade nine Technology Education teaching and curriculum requirements. An extensive examination of the literature relevant to the practice of teaching and learning of Technology Education in Grade nine classrooms has been made. The researcher commences the review with the requirements specified by the RNCS as teacher practice is described in relation to the RNCS. This chapter also examines the literature based on the conceptual framework and relates it to the entire study.

In reviewing the literature, the researcher looked at improving challenges in the RNCS for the enhancement of Technology Education teaching practices in Grade nine that is regarded as the critical level of the General Education and Training (GET) Band. Content Knowledge of the current curriculum (RNCS) reveals distinctive attributes of

teaching practice. It is a necessary requirement that all South African teachers should learn what proved to be effective in the current curriculum so that they can implement the good practices in conjunction with CAPS in their classrooms.

## **2.2 AN OVERVIEW OF THE REVISED NATIONAL CURRICULUM STATEMENT (RNCS)**

### **2.2.1 Outcomes- Based Education (OBE)**

According to the Department of Education (2002a, p.1), Outcomes-Based Education forms the foundation of the curriculum of South Africa. This argument is supported by the Department of Education (1997, p.10) that the new curriculum promises to provide all South African children with quality education which will ensure that learners gain the skills, knowledge and values that will allow them to contribute to their own success as well as to the success of their families, communities and the nation as a whole.

The RNCS is the 'streamlined' and 'strengthened' curriculum that was introduced in South African schools in 1998 after revising Curriculum 2005 (C2005). Outcomes-Based Education (OBE) was adopted as the approach that would enable the implementation of the new C2005 as well as the present RNCS. The (Department of Education, 1997) made the following claims regarding OBE:

- The move towards an Outcomes-Based approach is due to growing concern around the effectiveness of traditional methods of teaching and training, which are content based. An Outcomes-Based approach to teaching and learning, however, differs quite drastically and presents a paradigm shift.

- An Outcomes-Based Education and training system requires a shift from focusing on teacher input (instructional offerings or syllabuses expressed in terms of content) to focusing on the outcomes of the learning process.
- Outcomes-Based learning focuses the achievement in terms of clearly defined outcomes, rather than teacher input in terms of syllabus content.
- In Outcomes-Based learning, a learner's progress is measured against agreed criteria. This implies that formal assessment will employ criterion-referencing and will be conducted in a transparent manner.

According to Spady (1994, p.1), "Outcomes-Based Education means clearly focusing on and organizing everything in an educational system around what is essential for all students to be able to do successfully at the end of their learning experiences". The OBE framework defines the knowledge, competencies, attitudes and values which learners in different areas should acquire, develop and demonstrate.

In the South African OBE system there are different kinds of outcomes, namely the critical and Developmental Outcomes as well as Learning Outcomes.

- **Critical and Developmental Outcomes:** "The Critical and Developmental Outcomes are a list of outcomes that are derived from the constitution of South Africa and are contained in the South African Qualifications Act (1995). They described the kind of citizen the education and training system should aim to create". (Department of Education, 2002, p.11).

- **Learning Area Outcomes:** These are broad cross-curricular outcomes which are statements of intent which give direction and guidance to more specific outcomes. OBE fosters a more holistic approach, where integration of learning content is emphasized. In order to facilitate integration, the new curriculum is developed on the basis of learning areas. Each learning area has its own specific outcomes.

The Assessment Standard is another element which plays an important role in the RNCS. These Assessment Standards refer to specific knowledge, attitudes, proficiency and competences which should be demonstrated in the context of a particular learning area. It tells teachers how deep, how complex and how far to go with the content. It is not intended to prescribe to teachers as to what to teach, but rather to assist them. The Assessment Standards give teachers much more detailed information as to what learners should know and be able to do in order to show achievement. The outcomes and Assessment Standards “emphasize participatory, learners-centred and activity-based education” (Department of Education, 2002a, p.12). The RNCS policy document further states that the Learning Outcomes and Assessment Standards “leave considerable room for creativity and innovation on the part of teachers interpreting what and how they teach” (Department of Education, 2002a, p.12).

A study of Critical and Developmental Outcomes as well as Learning Outcomes and Assessment Standard for Grade nine Technology Education, clearly show that the focus has shifted. The rationale is that for too long South African learners have memorized

content, which they are required to regurgitate in tests and examinations (Hattingh, Rogan, Aldous, Howie & Venter, 2005, p.13). With the introduction of the OBE-based curriculum, children are not meant to be introduced to Technology Education as passive receivers of knowledge but as active participants in the construction of their own knowledge.

Killen (2005, p18) explains OBE as “makes teaching purposeful and systematic, rather than haphazard, while still allowing students to discover, to follow their interests, to take responsibility for their own learning, and to develop both personally and academically. It enables teachers to provide students with appropriate and purposeful learning experiences and opportunities so that they can develop originality, self motivation and independence at the same time as they acquire useful knowledge and skills”.

### **2.2.2 The kind of teacher that is envisaged by the Revised National Curriculum Statement (RNCS)**

The RNCS envisions “teachers who are qualified, competent, dedicated and caring” (Department of Education, 2002b, p.3). Teachers are seen as the “key contributors to the transformation of education in South Africa” (Department of Education, 2002b, p.3). The RNCS policy documents that this includes “being mediators of learning, interpreters and designers of Learning Programmes and materials, leaders, administrators and managers, scholars, researchers and lifelong learners, community members, citizens and pastors, assessors and Learning Area Phase specialists” (Department of Education, 2002b, p.3).

It is widely recognized that the role of the teacher is central to the teaching and learning of Technology Education. According to Battista cited in (Yates, 2006), teachers hold the key to reform in Technology Education. Bloch (2009, p.90) is in agreement with regard to the crucial impact the teacher has on the learner in the classroom by saying that “this is where the teacher faces the learner in an educational relationship. Using his or her mastery of the subject and of the curriculum, her pedagogical and methodological training and instincts, to ensure that work is covered and the educational needs of the child are appropriately met”. Cross (2008, p.908) concurs that in Technology Education classroom “the teacher’s role is crucial, not as the repository of knowledge, but as the one who initiates and guides the students in ‘community’ practices... maximizing the effectiveness of these classrooms requires the teacher to take on the role of ‘facilitator’ and not ‘transmitter of knowledge’”. Similarly, Capel, Leasky & Turner (1995, p.214) adds that “effective teaching and learning depend on the ability of the teacher to create learning experiences that bring desired educational outcomes”.

However, Battista in Yates (2006, p.435) asserts that “lack of congruence between curriculum innovation intent and teachers’ pedagogical knowledge, beliefs and practices as the most cited reason for the poor history of reform in Technology Education”. Johnson & Cupitt (2000, p.4) also argue that teacher confidence is a crucial factor in determining ways that teachers approach the teaching of Technology Education. If current Technology Education reforms are to be effectively implemented, teachers need to consider substantial changes to their role in the Technology Education classroom. They add that the practice of teaching Technology Education in primary schools goes

beyond the creation of Technology Education groups and the use of concrete materials (Johnson & Cupitt, 2004, p.4). In order to meet the diverse needs of the learners “teachers must create regular opportunities for sustained oral interactions in order to develop a discourse community in Technology Education classrooms in which the teacher and the students use discourse to support the technological learning of all participants” (Johnson & Cupitt, 2004, p.4).

The primary goal of Technology Education discourse community is “to understand and to extend one’s own thinking as well as thinking of others in the classroom” (Johnson & Cupitt, 2004, p.4). They further maintain that enhanced teacher confidence will encourage teachers to engage in open-ended problem solving activities and to explore Technological processes as well. “if you are sure that effective learning takes place in your classrooms, you need a theoretical framework to provide a context within which you develop your professional knowledge” (Capel, Leask & Turner, 1995, p.145). It is evident, through the activities as well as the programmes conducted at schools, that in order to successfully implement the RNCS, the Grade nine Technology Education teachers are required to broaden their technological knowledge and competencies.

## **2.3 THEORETICAL FRAMEWORK**

This study is underpinned by a theoretical orientation that upholds the relationship between the three main components of a learning environment, namely, technology, content, and pedagogy. Shulman’s model of Pedagogical Reasoning, a Framework for Teacher Knowledge, has much to offer to discussions of technology integration at multi levels: Technological Content Knowledge, Pedagogical Content Knowledge,

Technological Pedagogical Knowledge, and Technological Pedagogical Content Knowledge. (Mishra & Koehler, 2006). This theory is supported by the Reflective Teaching Model that examines underlying assumptions and becomes a useful model to understand the interaction of dispositions (being), practice (doing), and professional knowledge (knowing). These knowledge bases are viewed as essential for what prospective teachers should know and be able to do. This visual model for teacher reflection, as it was commonly referred to be, has been adapted from the works of Sparks-Langer (1992). A Framework for Teacher Knowledge can be illustrated as follows:-

### **2.3.1 Content Knowledge**

Content Knowledge (CK) is knowledge about the actual subject matter that is to be learned or taught. Teachers must know and understand the subjects that they teach, including knowledge of central facts, concepts, theories, and procedures within a given field according to Shulman (1986) in Mishra and Koehler (2006). Sparks-Langer (1992:81) argues that Instructors give special attention to the application of theory and practice by helping in making connections between relevant concepts through higher order questioning strategies. Fleisch (2008, p.v) explains how well children are taught and do Mathematics, being in the same category with Technology Education, among others, on “teachers’ views of their learners’ capabilities and teachers’ understanding of what the official curriculum requires of them”. A view supported by Battista cited in Yates (2006).

There is substantial agreement that teacher knowledge of Technology Education plays a key role in quality Technology Education teaching. According to Charalambous (2010, p.249), several studies examining teachers' responses to calls to reform their teaching have considered teacher knowledge a major contributor to their structuring and delivering of Mathematics lessons. Kersting, Givvin, Sotelo & Stigler (2010, p.172) concur when they say that "it seems obvious that one cannot teach what one does not know... without a doubt, the construct of teacher knowledge is far more complex than simply knowing the subject as we want students to know it". In addition to the specialized technological knowledge that is required for teaching, teachers need to have 'common content knowledge' (Ball, Thames & Phelps, 2008).

Fleisch (2008, p.123) asserts that "Researchers have recognized that what teachers 'know' is one of the most important factors that influence school classrooms and learner performance". Hill, Schilling and Ball (2004, p.13) cite Shulman who proposed three categories of subject- matter knowledge for the teaching of Technology. The first category Shulman called was "content knowledge" referring to the specialized nature of the subject-matter knowledge required for teaching. Shulman as cited in (Hill et al, 2004, p.12), includes that teachers need to understand how this "knowledge is generated and structured in this discipline". Ball et al (2008, p.391) adds that included in this category was "understanding principles and structures and the rules for understanding what is legitimate to do and say in the field". This implies that teachers have not only to understanding "that something is so, but they also need to understand "why it is so, on what "grounds it can be supported, and under what circumstances can

the belief in it is justification can be weaken or denied” (Bell et al, 2008, p.391). In addition, the teacher needs to understand why certain topics in Technology Education are vital and why certain topics are not as important.

The second category of subject-matter knowledge for teaching, (Shulman in Hill et al, 2004, p.13) is called “curriculum knowledge”. By curriculum knowledge Shulman meant that teachers are expected to have deep understanding of the full range of programs designed for a particular subject at a given level. “This involves an awareness of how topics are arranged both within a school year and over long periods of time as well as ways of using curriculum resources, such as textbooks to organize a program for study for students” (Hill et al, 2004,p.13). Shulman’s theory of teacher knowledge includes “general pedagogical knowledge”, by this he meant classroom management techniques and teaching strategies, knowledge of educational contexts as well as “educational ends, purposes and values” as cited in (Hill et al, 2004).

The third category of teacher knowledge Shulman called “pedagogical content knowledge” in (Hill et al, 2004.p.13). This special domain of teacher knowledge termed “pedagogical content knowledge” refers specifically to knowledge unique to teaching. Ball et al (2008, p.391) call this category the most influential of the three content related categories. This domain is supported by Mishra & Koehler, (2006) as well when they argue about the pedagogical knowledge as follows:

### **2.3.2 Pedagogical Knowledge**

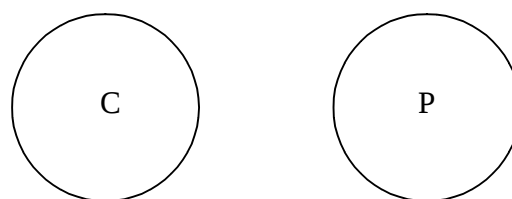
Pedagogical Knowledge (PK) is deep knowledge about the processes and practices or methods of teaching and learning and how it encompasses, among other things, overall

educational purposes, values, and aims. This is a generic form of knowledge that is involved in all issues of student learning, classroom learning, lesson plan development and implementation, and student evaluation. It includes knowledge about techniques or methods to be used in the classroom, the nature of the target audience, and strategies for evaluating student understanding (Mishra & Koehler, 2006). Sparks-Langer (1992) confirms that this knowledge identifies performance indicators and involves the tasks of planning, implementing, and evaluating.

### 2.3.3 Technology Knowledge

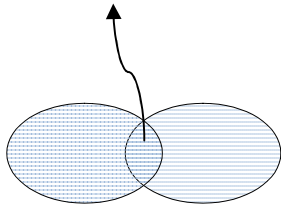
The question of what teachers need to know in order to appropriately incorporate technology into their teaching has received a great deal of attention recently (Mishra & Koehler, 2006). A constructivist approach seeks to connect theory to practice and views the student as a “thinker, creator, and constructor” Sparks-Langer (1992).

**Figure 2.1:** The Two Circles Representing Pedagogical and Content Knowledge



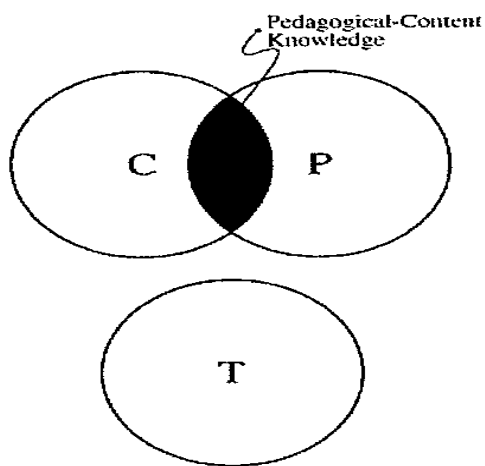
**Figure 2.2:** The Two Circles of Pedagogical Knowledge and Content Knowledge are now joined by Pedagogical- Content Knowledge

Pedagogical-Content Knowledge



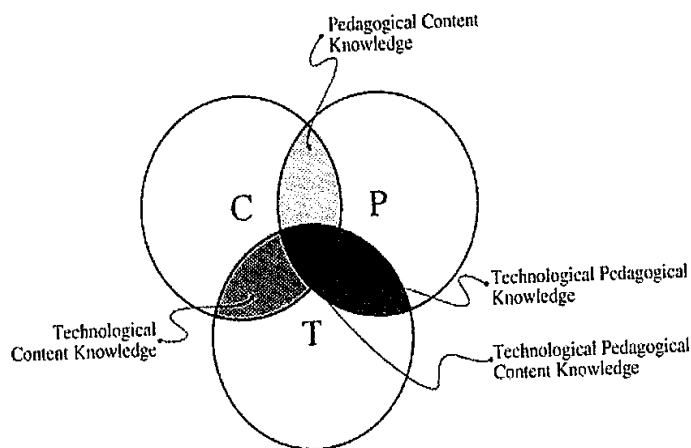
**Figure 2.3:** The three circles represent Pedagogy, Content, and Technology Knowledge

Pedagogical Content Knowledge



As shown by figure 2.2, Content and Pedagogy overlap to form Pedagogical Content Knowledge. However, Technology is seen as being a separate and independent knowledge domain.

**Figure 2.4** Pedagogical Technological Content Knowledge



As shown by figure 2.3, the three circles, Content, Pedagogy, and Technology, overlap to lead to four more kinds of interrelated Knowledge.

Linking the model with the study, Technology Education is promoting the use of an integrated structured approach. It is a multi disciplined Learning Area as it encourages the application of theory and practice. Theory is based on the Technological knowledge and understanding that the teachers teaching the Learning Area are expected to reflect, enabling them to apply such knowledge into practice through the constructivist approach. The Technology Education teacher is expected to be a great critical and creative thinker who utilizes the relevant methodologies. It is anticipated that by planning through research, they should be in a position to implement various designs with relevant and available resources, evaluating and communicating the processes in order to identify areas of improvement for refinement or modifications.

This domain is further supported by Kyriacou, (1990) when saying that effective technology Education teaching is essentially concerned with how best to bring about the desired learning outcomes by some educational activity. According to Koehler &

Grouws (1992), effective teaching is now viewed through a double lens, where the outcomes of learning are determined by the learners actions and thinking whilst these actions and thinking are largely determined by what the teacher does or say in the classroom. Bandura, cited in (Swars, 2005), claims that Technology Education teacher efficiency is directly related to a willingness on the part of the teacher to embrace educational reform, to be willing to try out instructional strategies, including strategies that may be difficult to implement and involve risks such as sharing control with the children.

## **2.4 TEACHING STRATEGIES IN TECHNOLOGY EDUCATION CLASSROOM**

This chapter aims to arrive at a conceptual understanding of Grade nine Technology teaching practices. Technology is a demonstration of human inventiveness (Lewis, 1999:49) cited by (Smit, 2007). This is further supported by Fahmy (2004) cited in Smit (2007) by stating that this implies a needed change in our teaching methods and the design of the new applied teaching methods to explain the process resulting in the development of Technology in the 'real' world.

It is very important that an integrated approach should be used to teach Technology Education because it will enable learners to apply the relevant technological knowledge they gain in all aspects of their lives, as well as to understand the interrelationship between Technology, society and the environment (Smit, 2007:32). The current methods of teaching Technology Education encourages certain aspects of learning but often leaves large gaps that are not complete (Wicklein, 1997:77 cited in Smit, 2007).

(Pullias 1992:4 cited in Smit 2007) states that teachers will have to open their eyes and realize that Technology Education is new and completely different from the other learning areas.

Artzt & Armour-Thomas (2002, p.22) argue that educators need to reflect on their goals for instructional practice. They further maintain that a teacher whose goal is that students engage in Technological reasoning tends to orchestrate the classroom discourse in such a way that the burden of explanation is placed on the student.

*Teacher who consider themselves facilitators of student learning tend to use instructional strategies that foster communication among students and challenge students to think for themselves and engage in Technological reasoning...Teachers who believe that the role of all students in the classroom is to be active participants in their own learning tend to create social and intellectual climates that set the stage for discourse that can offer every student an equal opportunity to participate (Artzt & Armour-Thomas, 2002, p.32).*

The NCS is based on an approach to teaching Technology Education that focuses on 'doing' Technology Education as a science of pattern and order, in which learners actively explore Technological ideas in a classroom environment that is conducive to learning.

Thinking is said to be developed by the demands of communication. Therefore, organizing students in small groups to complete Technology Education tasks and then to present their solutions to the class has the potential of promoting thinking. These opportunities to communicate play a decisive role in Technology Education learning.

The teachers' role is to guide students towards a set of shared norms that include: cooperation to produce mutually acceptable solutions methods and interpretations, "persist" and consider alternatives, "courage" to propose ideas, ask for explanations and evidence and for Mathematical solutions to be explainable and justifiable, and operate as a community of "consensual validators" (Cobb, Wood & Yackel, 1991).

Technology is a constantly developing learning area/subject that is very important for mankind's future. As pointed out by Atkinson (1994:32 cited in Smit 2007), the rapidity and extent of educational change in schools has been considerable, both for the school curriculum as a whole and for Technology as a learning area in particular. The lack of time in which to consolidate, reflect and evaluate what they have to teach has impinged directly upon teachers who plan and deliver the curriculum.

Ankiewicz (2003:579-80 cited in Engelbrecht, Ankiewicz and De Swardt 2007), argued that teachers were unsure of how to approach lesson planning in this new learning area. Consequently, they taught content and skills related to their technical subjects by simply using a different approach, thereby neglecting the procedural knowledge (technological process) as an essential feature of technology education.

Simao (2008) argues that the success in curriculum implementation relies on several factors such as the particular school environment, availability of resource, teaching-learning methodologies, and evaluation strategies among others. However, the argument points out that the socio-cultural setting, the cooperation between the department of education and the related work places and attitudes of learners, teachers

and other stakeholders involved in the process could make a huge difference too. In this regard, Freiberg and Stein (1999:11) cited by Simao (2008) argue that a conducive school climate inspires teachers' creativity and eagerness, and elevates all its members. The involvement of stakeholders such as parents and organizations in schools life helps to ensure that a strong supportive relationship of trust exists for purposes of improving teaching and learning (Lieberman, 2001; Schubert, 2005) cited in Simao (2008).

Technology Education is a process more than a product, using case study, resource tasks and capability task as effective methods. Learners are being referred to a certain related situation in order to understand the current problem scenario. They are being equipped with short, structured tasks for the technological process (Ter-Morshuizen, Thatcher & Thomson, 1992). Ter-Morshuizen et. al. (1992) emphasize the fact that it ought to be evident that much of the research team work consists of on-site intervention in response to particular issues.

Falmer, Taylor and Francis (1998) suggested that group work is valuable in encouraging cooperative work in planning, sharing responsibility and allocating task, and in fostering team work. This is also supported by Gill (2004) that the active sharing of ideas gives each child a broader base from which to think of the new ideas. Heymans (2007) disagrees with Falmer, Taylor and Francis (2002) when saying some do the work and everybody receives the marks. This implies that it is not always the case that

learners participate in the group work except that interactive approach has been applied.

It is, therefore, a consistent vision of teacher preparation for integrated teaching and learning at secondary school a level that is characterized by peer collaboration and team teaching. Berlin and White (2001) affirmed the importance of integrating, connecting, and aligning Maths, Science and Technology in education along with strategies and tactics for such integration. They continued saying that the subjects should be integrated but the difficulty lies in how to integrate and the practicality of the integration in actual school settings. By teaching our students in a setting where the relationships between fields are valued, we create a powerful process in the classroom. These relationships, they continued, create ties to real- world applications for concepts (Berlin and White, 2001, p.5).

Wicklein and Schell (1995) added on the above view by stating that the integrative or multidisciplinary curricular approach related to technology education seeks to help students learn and appreciate the relevancy of how school subjects are tied together and how each subject builds on the other. If educators are going to be convinced to change the practice by integrating Technology into their teaching, they must see the relevance of Technology to what they do in the classroom (Browne & Ritchie, 1991; Shelton & Jones, 1996). Simao (2008) argue that the key to success resides in coordination, in improving relationships, in creating and sharing knowledge. Teachers,

therefore need to network, organizing mentoring programmes so that they can be able to support one another.

The environment in which the effective Technological development of teachers occurs is built around collaborative learning. Because teachers vary in their level of expertise at the time of their training, the context which surrounds their Technological professional development must provide a non-threatening environment that is sensitive to the individual teacher's level of expertise and experience (Browne & Ritchie, 1991; Shelton & Jones, 1996) cited in Brand (1997).

## **2.5 TEACHING AND LEARNING RESOURCES IN TECHNOLOGY EDUCATION CLASSROOM**

Monyokolo and Potenza (1999) and Marsh and Willis (1999 & 2003, cited in Simao, 2008) contend that learning materials are a critical part of curriculum implementation. However, the mere use of learning materials does not in itself guarantee effective teaching and learning. That means that learning materials should be used in an effective manner. Brown, Oke and Brown (1982, cited by Simao, 2008) argue that it is the careful selection and skilful handling of learning resources by the teachers that could make them useful in facilitating teaching and learning. Eggleston (1996) argues that there is relatively less emphasis on practical activities, particularly those of a skilled nature. This is caused by a wide spread inadequacy of resources and of the in-service training necessary to ensure successful delivery of the new requirements.

Anthony & Walshaw (2009b, p. 23) argue that materials offer learners “thinking spaces, helping them to organize their technological reasoning and support their sense making...materials provide vehicle for presentation, communication, reflection and argumentation”. They continue maintaining that manipulatives are materials designed to provide concrete, hands-on experiences that can help students make the link between technological concepts and the real world.

ITEA (2000) maintains that students learn best in experiential ways, by doing rather than only by seeing or hearing. This is also supported by Hattingh, Aldous and Rogan (2007) when emphasizing that the quality of the practical work predicts the possible indicators of the capacity of the school to implement the curriculum. Smit (2007) supports that learners require resources so that they can complete their practical tasks. These resources, he continues, are not provided by the Department of Education and most schools do not have the financial capability to purchase the required resources (Potgieter, 2004:215) cited in Smit (2007). Good use of resources may lead to appropriate end results. The room in which learners work will have been designed to encourage them being creative (Cadman and Rateliffe, Hodder and Stoughton, 1990). This goes together with the fact that Technology is a practical learning area/subject, therefore, its success is in the integration of theory and practice. Ter-Morshuizen, Thatcher and Thomson (1992) agree with Cadman and Rateliffe (1990) when they support this argument. They point out that manipulative skills should be mastered gradually to ensure a pleasing and effective product.

Mahomed (1999:165 cited in Simao 2008) asserts that teachers need to be made aware of and encouraged to use creatively whatever is available, and to access other resources skillfully. Teachers needed to be encouraged to improvise especially those in rural areas as they (rural areas) are rich in natural resources and creativity. Shelton and Jones (1996), Gulhin (1996), Stager (1995), Pearson (1994), Kinnaman (1990), and Persky (1990) all identify the virtues of having a full-time Technology resource teacher in the school or district to bring Technology into the basic fabric of the curriculum. Having a Technology resource teacher is especially beneficial for novice users, or those at the emerging stage of technological use and understanding, they explain. They further state that whether this person is at the site or the district, just having someone in such a role can be a valuable asset in creating, implementing, and directing a global vision for integrating Technology into schools.

## **2.6 TEACHER PERCEPTIONS FOR MEANINGFUL TECHNOLOGY EDUCATION TEACHING**

Teachers are a major factor in the implementation of Technology education and their attitudes are pivotal in achieving the envisaged educational ideals (Pudi, 2002). It seems that Technology Education is more dynamic than its technical predecessors and that current Technology is more dynamic than in the past (Heymans, 2007). The most prominent factor appears to be the teachers' perceptions of their learners. Teachers who perceive their learners to be motivated and non-disruptive are more likely to engage learners in higher-level types of practical work. Also important, but to a lesser extent, is the attitude of teachers towards innovation. It would appear that in a school where innovation is generally supported, science teachers engage in higher levels of

practical work. Teachers perceive Technology Education as a new learning area/subject, therefore they are still grappling with understanding what exactly it entails (Garson, 2000:3) in Pudi 2002). Lewis (1999:5, in Pudi, 2002) holds that understanding the conceptions and misconceptions about technology and technology education is a prerequisite for better teaching and learning.

### **2.6.1 Technology**

Naughton (1986, p2) in Pudi (2002) points out that technology as machinery has severe limitations because technology is broader than just machinery. Many young people equate technology with computer (Solomon, 1993, p.55). Technology is more than just computers. It is to do with means and ways to achieve needs and wants. It is a way of life (Pudi, 2002).

Technology is more than just the finished product or technological artifact. The process of making ( planning and designing) a technological product is also an important aspect of technology as well as the ability to understand how it can be used beneficially, ethically and responsibly (Pudi, 2002). Naughton (1986, p.9 cited in Pudi 2002) is in contrast with Pudi (2002) in the above argument when regarding technology as both scientific process as well as a spontaneous process as in crafts, like pottery, where there is no form of social organization. Technology follows a scientific process as a practical solution to a problem.

### **2.6.2 Technology Education**

Zuga (1999:1-3 cited in Pudi 2002) often perceives the subject of technology education as male domain, especially after they have taken a course in technology education. This is deceptive because technology is a way of life for everyone, not just men. Technology is to be found in all spheres of life. Technology education is not career or vocational based. This may be despite the notion that it might encompass aspects of vocational fields, such as carpentry or engineering, as a means to achieving the overall purpose of meeting human wants and needs (Pudi, 2002).

Information Technology (IT) together with technology education is part of the core learning area of Technology in Curriculum 2005. Computers play a major role in the technology education approach since they are an integral part of modern technology Pullias (1992:3) cited by Pudi (2002).

### **2.6.3 Technology as a Learning Area/ subject**

It is the field of knowledge that is embedded with various technological related areas promoting the use of knowledge, skills and resources to meet people's needs and wants by developing solutions to problems, taking social and environmental factors into consideration Revised National Curriculum Statement (RNS) for Grades R-9 (schools) (2002).

#### **2.6.4 How Educational Technology differs from Technology Education**

Stone et al (2000:2, cited in Pudi, 2002) confirms that technology education is not the same as educational technology. Educational technology involves all the machinery used in education such as computers, projectors and video machines.

#### **2.6.5 Technology Literacy**

Technology literacy involves understanding what technology and technology education really are and the proper implementation thereof (Pudi, 2002).

### **2.7 TECHNOLOGY EDUCATION TEACHER CHALLENGES**

Teachers were simply given the new policy documents for technology and told that they replaced the old syllabus. These documents are very confusing to most teachers and very difficult to interpret if one is faced with a very unfamiliar learning area. Ankiewicz and De Swardt (2002) cited in Engelbrecht, Ankiewicz and De Swardt (2007). Olaniyan and Ojo (2007) regarded introductory technology as an integrate subject comprising of woodwork, Metalwork, Building Technology, Auto Mechanic, Electrical/Electronics and Technical Drawing at their basic level.

Ankiewicz (2003) cited in Engelbrecht, Ankiewicz and De Swardt (2007) has taken the argument further by stating that one of the challenges of teachers teaching Technical subjects was that they were used to focus on only one discipline, while technology education requires teachers to be well versed with various themes of technology. This stands to reason that such teachers do not do justice in teaching technology as it is regarded as an integrated learning area/subject. It is the union of science, mathematics,

and technology that forms the scientific endeavour and makes it so successful. Although each of these human enterprises has a character and history of its own, each is dependent on and reinforces the others. (American Association for the advancement of science, 1993).

The science and mathematics are important to the understanding of the processes and meaning of technology Education. Their integration with the Technology Education curricula is vital (American Association for the advancement of science, 1989, p.9). Ankiewicz (2003 cited in Engelbrecht, Ankiewicz and De Swardt 2007) says that because of the discontinuation of traditional technical subjects, qualified and competent teachers in subjects, such as Home Economics, Woodwork, metalwork, and industrial Arts, were generally assigned the responsibility of implementing and teaching technology. These teachers, he insists, were confused by the introduction of technology education, as they had been accustomed to traditional instructional methodology in the manipulation of materials and the use of technology within the context of their traditional subjects. Heymans (2007) being supported by Potgieter (2004) maintains that the most problematic issue is to implement very new pedagogy when the teaching force may be ill prepared and where the classroom experience needed to transform.

Many teachers do not have the necessary competence (knowledge, skills and instructional methodology) to facilitate technology properly. Potgieter (2004:212 cited by Engelbrecht, Ankiewicz and De Swardt 2007) state that teachers must have substantial time if they are going to acquire and, in turn, transfer to the classroom the knowledge

and skills necessary to effectively and completely infuse technology into their curricular areas Boe (1989), Hawkins and MacMillan (1993) and Kinnaman (1990 cited by Brand 1997) affirmed the above statement. Teacher training programmes must not expect that all participants will leave with the knowledge and skills to facilitate the transfer of learning to their individual classrooms. Brone and Ritchie (1991), Harvey and Purnell (1995), and Stager (1995) cited in Brand G.A, 1997), state that, instead, effective staff development in Technology Education requires flexible content and opportunities.

However, Harvey and Purnell (1995) suggest that there is overwhelming sentiment that schools have yet to create the kind of training and practice time teachers need in order to learn how to effectively integrate Technology Education into the curriculum. Shelton and Jones (1996) cited in Brand G.A,1997) suggest that teachers need considerable training and development time outside the school day so that they can concentrate on instruction and training objectives without having to deal with the normal school day demands. One of the most effective ways to align staff development with the district/school goals is to invest in someone with experience in both Technology and curriculum (Kinnaman, (1990) cited in Brand, 1997).

## **2.8 SUMMARY OF THE LITERATURE REVIEWED**

The focus of this chapter was to review a range of literature relating to this study. The literature reviewed highlighted the critical and central role of the teacher in the classroom. It is evident from the literature that teachers need a thorough knowledge of the Revised National Curriculum Statement (RNCS) and how to 'unpack' the Learning Outcomes and the Assessment Standards, having expert knowledge in the field of

Technology Education content and pedagogy as well as excellent management skills to support them.

In the next chapter, the research methodology and design will be discussed.

## **CHAPTER THREE**

### **RESEARCH DESIGN AND METHODOLOGY**

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#### **3.1 INTRODUCTION**

The previous chapter highlighted that the teaching of Technology Education should be in multi levels. It should be underpinned by a theoretical orientation that upholds the relationship between the three main components of learning environment, namely, content knowledge of the subject, knowledge of pedagogy of teaching Technology Education as a subject or learning area and the knowledge of the relationship between theory and practice (Mishra & Koehler, 2006). These knowledge bases are viewed as essential for what prospective teachers should know and be able to do. Furthermore, this theory should be supported by a reflective teaching model that examines underlying assumptions and becomes a useful model to understand the interaction of dispositions (being), practice (doing), and professional knowledge (knowing).

The main focus of this chapter is to examine the research process of this study. In order to do this, it is necessary to draw the researcher's attention to the purpose of this research. The first purpose of this research was to describe current teacher practices in the teaching of Technology Education in their Grade nine classrooms. The research focus was directly concerned with the teachers' facilitation of Technology Education learning. This chapter demarcates the field of investigation within a methodological framework. This chapter describes the research methodology as well as highlights the

procedures followed in the administering the instruments used in the data gathering process. In addition, the four issues of trustworthiness of the data, namely credibility, transferability, dependability and conformability, are addressed in this chapter.

This study investigates into the study of Technology Education instructional practices in Grade nine classrooms in the King William's Town schools: A case study into three Senior Secondary Schools. The research questions that serve as a guide to the aims of this study are the following:-

- What practices in Technology Education and technological activity are prevalent among Grade nine teachers?
- What are the practices of teaching Technology Education that would best facilitate Technology Education learning in Grade nine?
- What teaching strategies are employed by these Grade nine teachers in their classrooms?

This chapter provides a description of the logic behind using the selected methods and techniques for the present study and a narrative of the design and its appropriate methodology. Wellington (2004, p.22) cited by Smit (2007) defines research methodology as "...the activity or business of choosing, reflecting upon, evaluating and justifying the methods you use. No one can assess or judge the value of a piece of research without knowing its methodology". Research methodology includes variables such as target population, size and description of the sample, and research instruments used. It is the blueprint for the data collection, measurement and analysis of the data in

order to achieve the objectives of the study. Thus, while it outlines details of the study; the design of the research, the decisions regarding population and sampling procedures followed, methods employed to collect data and procedures used to analyse the data, the primary focus of this study was to come up with empirically tested results and conclusions on Technology Education teaching and learning instructional practices in Grade nine classrooms.

### **3.2 RESEARCH APPROACH: QUALITATIVE APPROACH**

The study adopted a qualitative research approach. Qualitative approach was appropriate for this study as it was more suited to provide the researcher with the responses to the questions in this study. This was because the researcher attempted to gain an in-depth understanding of a situation under which teachers experience in their teaching practices.

According to Holiday (2002), qualitative studies set up research opportunities designed to lead the researcher into areas of discovery within the lives of people he/she is investigating. Patton (1980) as cited in Carson, Gilmore, Perry and Gronhaug (2001) also asserts that using qualitative approach will help the researcher to gather data which provides a detailed description of events, situation and interaction between people and things and providing depth and details. In Martens (2005, p.229) describes qualitative research as “a set of interpretative, material practices that make the world visible”. Patton in Carson et al maintains that qualitative approach is concerned with things that really happen in organizations as researchers and people experience them. Sarantakos (1998) maintained that, in qualitative research, data collection involves a

dynamic process of gathering, thinking, evaluation, analyzing, modifying, expending, gathering further and thinking again. This is in addition to the fact that data collection in qualitative research is geared towards natural situations, everyday-life worlds, interaction and interpretation, hence the researcher has to organize this element of investigation to meet these methodological requirements.

Beyond this notion, the qualitative researcher is engaged in the research situation or problem and is more tolerant, flexible, permissive and understanding. This ultimately shows that the nature of qualitative research dictates that the researcher employs means and techniques that are closer to the research situation, so that the everyday-life situation is reflected fully and clearly in the findings.

According to Maykut and Moorhouse (1994), to understand the world under investigation, people's words and actions are used by qualitative researchers. In this study, the researcher attempts to capture the social settings of teachers by what they say and do. This is a kind of situation where teachers interpreted the world around them. The opportunity is for the researcher to understand the situation as it is constructed by the teachers. In acknowledging this view, Holiday (2002) maintained that qualitative research methods look deeply into behavior within special social settings rather than at broad populations. Using qualitative method further invoked the need to discover as much about the information teachers provide as about the information itself.

According to Babbie and Mouton (2002), the emphasis of qualitative research is for the researcher to attempt to study of human actions from the perspective of the social

actors themselves. The implications are that the researcher needs to position himself to describe and understand rather than explaining human behavior. Aaker, Day and Kumar (1995) maintained that certain research prospects in qualitative research cannot be observed and measured. It is for this reason that Babbie and Mouton (2002) insist on emphasizing on the researcher to know the actors perspective (the insider). These sentiments were echoed by Aaker et al (1995) who suggested that the qualitative researcher should develop a longer, more flexible relationship with the respondent so that the resulting data have more depth and richness of content. This also means a greater potential for new insights and representatives. Hence, Babbie and Mouton (2002) further saw the primary aim of qualitative research as in depth descriptions and understanding of actions and events. Straus and Corbin (1991, p.17) as cited in Chabanga (2004) concluded by stating that “by qualitative research we mean any kind of research that produces findings not arrived at by means of statistically procedures or other means of qualification”. The researcher then chose to work within the qualitative approach with the aim of receiving perceptions from the teachers themselves who had to narrate their own experiences and interpretations pertaining to the area of study.

Key (1997) identifies the following advantages and disadvantages of qualitative research which are discussed in the following section.

*(a) Advantages of qualitative research*

- Produces more in-depth, comprehensive information. The study attempted to use a case study method to investigate the in depth knowledge and

understanding on teachers instructional practices in Grade nine Technology Education classrooms.

- Uses subjective information and participant observation to describe the context or natural setting, of the variables under consideration as well as the interaction of the different variables in the context. The researcher's method of gathering data was used on teachers, where the teachers were free to talk about their teaching practices in Grade nine classrooms.

*(b) Disadvantages of qualitative research*

One of the major disadvantages of qualitative research is that the very subjectivity of the inquiry leads to difficulties in establishing the reliability and validity of the approaches and information. The researcher by all means tried to avoid situation where leading suggestions for participants were given. Qualitative research is criticised for being contemplated at early or exploratory stages of a study (Silverman, 2000). The researcher used the observation and documentary analysis as means of trying to estimate the extent of the problem in teaching and learning practices of Grade nine classrooms.

In order to ensure validity the researcher remained non-judgemental throughout the study process and reported what was found in a balanced way. McMillan & Schumacher (2001) state that qualitative method follows no strict rules. This means that researchers are cautioned not to allow mindlessly inventive process. Qualitative research should be done artfully, but it also demands a great amount of methodological knowledge and intellectual competence.

### **3.3 RESEARCH PARADIGM**

The appropriate paradigm used in this study was the interpretive paradigm. A paradigm provides a conceptual framework for making sense of the social world, and in the case of this research, for guiding the approach taken. This study focuses on teachers' Technology Education instructional practices to facilitate learning. Working in this paradigm opens up the opportunity to find out how the participants understand and implement the RNCS based on their teaching practice rather than theoretical knowledge. Within the research process, the beliefs a researcher holds will be reflected in the way the research is designed, data collected and analyzed, and how the research results are presented. The significance of a research paradigm is that it guides the researcher's actions (Cohen, Manion & Morrison, 2000).

#### **3.3.1 Interpretative Paradigm**

The central concern of the interpretative paradigm, according to Cohen et al (2000, p.22) is "to understand the subjective world of human experience". They further add that "the interpretative paradigms strive to understand and interpret the world in terms of its actors. (Ibid, p.22).

According to Bassey (1995:12), the interpretive tradition is defined as a search for deep perspectives on particular events for theoretical insights. It may offer possibilities but no certainties as to the outcome of future events. The interpretivists believe in the descriptions of human actions as based on social meanings that people have (Cohen, Lawrence & Morrison, 2000). This study, therefore, gave Grade nine teachers an opportunity to construct their understanding on teaching practices and what made them

to use such practices. The researcher was then able to place real-life events and phenomena into some kind perspective. Terre Blanche, Kelly & Durrheim (2006, p.274) further maintained that interpretive paradigm relates to taking people's subjective experiences seriously as the essence of what is real for them. It also makes sense of people's experience by interacting with them and listening to how they construct their social worlds. This study, as a result, did not focus on isolating and controlling variables but on extending the expression to help understand the social world in which teachers live (Brown & Dawling (1998). Finally, Ernest (1994, p.24) cites that the interpretive research paradigm "is primarily concerned with human understanding, interpretation, intersubjectivity, lived truth (i.e. truth in human terms)". The interpreter wants to get close to the phenomenon he or she is studying in order to understand human experience.

### **3.4 RESEARCH DESIGN**

The design is the blue print in terms of which the study is conducted (De Vos et al, 1998). It is from this perspective that Saunders et al (2003, p.125) believes that the research design chosen must suit the nature of the research being undertaken. A research design outlines how the research is conducted beginning to end (Mouton, 2001, p.55). Since the purpose of this study was to understand teaching practices and the researcher is interested in gaining an in-depth understanding of how do grade nine Technology Education teachers and learners use teaching and learning practices in the King William's Town school classrooms, a case study design would allow the researcher to explore this understanding.

Leedy & Ormrod (2001) describe research design as a complete strategy for attack on a central problem by providing the overall structure that the researcher follows, the data he collects and the data analysis that follows. The aim of this study was to address the relationship between existing practices of school Technology Education teaching and learning and the curriculum requirements. To achieve that the researcher chose a research design for this study, as its qualitative methods provided sufficient flexibility for describing, interpreting, exploring and explaining the process as well as the products of teaching and learning.

### **3.4.1 A Case Study Design**

Bell (1993, p.8) states that a case study gives an opportunity for one aspect of a problem to be studied in some depth within a limited time scale. The greatest advantage of the case study, according to Bell, is that it allows the researcher to concentrate on a specific situation and try to identify the various interactive processes at work. It also involves the “collection and recording of data about a case or cases, and preparation of a report or a presentation of the case” (Stenhouse, 1988:49). Eisner and Peshkin (1990:29) assert that a case study puts emphasis on “practice, participation, reflection and interpretation”. Three grade nine teachers teaching Technology Education were selected from the three selected schools as cases in this study. One school per circuit was selected.

Yin (in Saunders et al., 2003, p.140) distinguishes between a single-case strategy and a multi-cases strategy by noting that whereas in a single-case strategy a unique phenomenon is studied, in a multi case strategy more than one case is studied. The

multi cases approach allows the researcher to establish whether the findings of one case occur in other cases (Yin in Saunders, et al., 2003:140). The researcher involved four schools, in which Technology Education as a learning area was taught. For this reason, the multi-case type case-study design was preferred in this study.

The researcher adopted the qualitative case study method for this research. In the qualitative case study, according to Denzin and Lincoln (1994), the researcher spends substantial time on the site, has personal contact with the activities and operations of the case, and reflects and revises the interpretation of what takes place on a site. Bell (1993: 8) states that a case study would give an opportunity for one aspect of a problem to be studied in some depth within a limited time scale. Aaker et al (1995) defines a case study as a comprehensive analysis of a single situation. Similarly, Babbie and Mouton (2002) describe a case study as an intensive investigation of a single unit. This emphasizes that an individual unit is a defining characteristic of a case study. A case in this study is an investigation into the teaching and learning instructional practices that the Technology Education teachers used in teaching Grade nine learners among four schools. This is a multi-case type case study because it referred to teaching and learning practices in four schools. Gilham (2000) asserts that a case study investigates an individual to answer specific research questions and seeks a range of different kinds of evidence.

Yin (1989) as cited in Allan and Skinner (1991) maintains that in a case study the emphasis is on investigating contemporary phenomena in their real life context. To achieve this investigation, suitable resources and instruments are needed to carry out

the research. In this instance, Huysamen (1994) talks of the researcher as a fieldworker who conducts the investigation on the spot under natural circumstances specifically when dealing with a group. This view is supported by Kuper and Kuper (1996) who contends that data is collected by direct presence in the site or face to face interaction with the subject. The researcher in this situation was regarded as an instrument himself. On the side, the researcher would deal with the focus group using semi-structured interviews, direct classroom observation, and document analysis. The mere aim was to obtain factual information on teaching and learning practices.

The greatest advantage of the case study, according to Bell (2005), is that it allows the researcher to concentrate on a specific situation and try to identify the various interactive processes at work. It also involves the “collection and recording of data about a case, and preparation of a report or a presentation of the case” (Stenhouse, 1988, p.49). Eisner and Peshkin (1990, p.29) assert that a case study puts emphasis on “strategies, participation, reflection and interpretation.”

In line with the protocols of a case study design, this study used a combination of methods as follows:

- (a) Interviews
- (b) Classroom observations
- (c) Document analysis

### **3.5 DATA COLLECTION PROCEDURE**

The researcher chose three Grade nine Technology Education teachers from the three different schools in the King William's Town district to participate in the research. The schools chosen were an assortment of the schools in the area. This was done in order to understand Grade nine teacher practices from different perspectives. The researcher first visited the Education District Office as this was the requirement for carrying out research in the schools. The researcher then gained access to the respective Grade nine classrooms through the respective principals of the schools. After the personal conversations with the institution authorities and the teachers, the researcher made an arrangement for the interviews, classroom observations and documents analysis.

It was confirmed that all that was conducted was done at the schools where the participants' place of work was or in any other convenient locations available. The teachers were asked to volunteer to be part of the study. The teachers' anonymity was assured and written permissions were obtained from all the teachers before embarking on this research. The researcher spent time in each of the Grade nine classrooms becoming familiar with the teacher as well as learners in order to "establish a rapport and to gain their trust" (Leedy & Ormrod, 2001, p.151).

It was anticipated that the process would take two consecutive days per school, one day to cater for interviews and another one for direct classroom observations and document analysis. But due to the National Industrial Strike, the researcher had to take one day per school for all the activities.

According to Denzin and Lincoln (1994, p.19), the term research instrument refers to any plan of action that helps the researcher in gathering the relevant data. In the spirit of qualitative research, this study made use of multiple data collection methods as follows:

- Interviews
- Direct Classroom Observations
- Document analysis

The researcher may select and use a number of methods of data collection. This is referred to as triangulation. Triangulation, according to Cohen and Manion (1985, p.254), may be defined as the “use of two or more methods of data collection in the study of some aspect of human behavior”. This is supported by Anderson (1998, p.131) when he states that triangulation is “the use of multiple data sources, data collection methods and theories to validate research findings”. He further states that triangulation also helps in eliminating biasness and can help detect errors or anomalies in your discoveries. Terre Blanche, Durrheim, and Painter (1999, p.287) also added that triangulation entails collecting material in as many different ways and from as many diverse sources as possible. They continued saying that this can help researchers to ‘hone in’ on a better understanding of a phenomenon by approaching it from several different angles. For this study, various research techniques or methods used were semi- structured interviews, direct classroom observations and document analysis.

### **3.5.1 Semi-Structured Interviews**

Listening is probably the most important activity of a researcher during the field work. By listening and asking open-ended questions is how the researcher understands the

participants. Because asking questions is so important, interviews are listed as a method of equal importance as participant observation (Anderson-Levitt, 2006, p.280, 288). The interviews allowed the researcher to access the thoughts of the participants.

According to Fontana and Fray (1994), semi- structured interviews provide a greater wealth of information. In such interviews the interviewer simply suggest the general theme of the discussion and poses further questions as these come up in the spontaneous development of the interaction between the interviewer and research participants. Welman and Kruger (1999) understood the semi-structured interviews as a much more flexible version of the structured interview. There is much opportunity on the part of the researcher to probe and expand the participant's responses. The advantages and the disadvantages are addressed as follows:

#### **3.5.1.1 *Advantages of the semi-structured interviews***

- The great advantage of the semi-structured or non-directive interview is 'its flexibility...' as Markson and Gognalons-Caillard (cited in Stones, 1988, p.152) point out.
- With semi-structured interviews, the researcher has a set of questions on an interview schedule but the interview was guided by the schedule rather than be dictated by it. In this type of an interview, the ordering of questions was less important and the interviewer was free to probe any interesting areas that arise.

### **3.5.1.2 *Disadvantages of the semi-structured interviews***

- Language can block understanding between the researcher and the participants. This is especially true if they do not share a common vocabulary and meanings. There is a possibility that some elements of the interviews were not properly understood by the participants or the responses not properly comprehended by the researcher. To come to a solution, the researcher as well as the participant had to illustrate their interviews by using gestures, code switching as well as using technology (computer for a example) to write their interaction down so that it can be read repeatedly at the pace of the researcher or the participant.
- The researcher was aware that participants were not always willing to share all that needed to be explored. The researcher therefore tried to make the atmosphere conducive by narrating some of her teaching experiences and the significance of sharing with other people.

### **3.5.2 Direct Classroom Observations**

Participant observation is an integral part of the research. The researcher, however, did not have the opportunity to be an active participant in the classrooms but rather a 'privileged observer' with occasional chances to speak to the learners and the teacher. Consistent with Wolcott's (1997) description of a privileged observer, the researcher sat in an unobtrusive spot in the classroom and observed the lessons. The purpose of observations is to give the researcher direct firsthand experience of the phenomena that are being studied (Cantrell, 1993). The researcher had minimal interaction with the teacher or the learners.

While the learners were engaged with activities, the researcher walked around the classroom to observe the learners at work as well as to unobtrusively observe teacher-learner interactions. The researcher made copious notes in each lesson observation in order to capture “the wide variety of ways in which people act and interact” (Leedy & Ormrod, 2001, p.195).

#### **3.5.2.1 *The advantages of the classroom observations***

- One of the biggest advantages of observation is that the researcher can do it anywhere (Kelleher, 1993) cited in Babbie and Mouton (2001).
- They continued stating that the presence of an observing, thinking researcher on the scene of the action is of greatest advantage.
- “The primary advantage of conducting observations is flexibility” meaning that the researcher could easily “shift focus as new data came to light”.
- Conducting observations physically provided the researcher with multiple impressions of the participants
- It allowed the researcher to clarify processes and examine causality and therefore suggest why things happened in a particular setting.
- Observation allowed the researcher to examine actual teachers’ practices compared to what the teachers said about their teaching practices.

#### **3.5.2.2 *The disadvantages of the classroom observations***

- “By the very presence of the researcher in the classroom, she/he may alter what people say and do and how significant events unfold” (Leedy & Ormrod, 2001, p.158).

- Observation as a method is time consuming and labour-intensive. Observation is prolonged and repetitive. Lessons have to be observed more than once.
- The researcher was aware that the results could end up being subjective depending on researcher's personal biasness.
- The researcher had to develop the crucial technique of recording observations in writing.
- The researcher was aware that the observation results produced could be over-impressionistic, carelessly produced or idiosyncratic.
- The researcher was aware that observation could affect the participant's behaviour, and may differ during the researcher's presence and absence.

It is important to remember that in observation it is vital that the researcher makes full and accurate notes of what went on. The notes should include both the empirical observations and the researcher's interpretation of the observations (Babbie & Mouton, 2001). They emphasized further that sometimes the note taking can be made easier if the researcher prepares standardized recording forms in advance. It was important for the researcher to ensure that field notes and detailed descriptions of what actually happened were accurate rather than interpretative comments. Field notes can be subjective so it was necessary for the researcher to have additional research tools.

### **3.5.3 Document Analysis**

According to Brown and Dawling (1998), documents are an outcome of everyday activities. They therefore provided the researcher with the sort of data that are most likely to be used in answering the questions posed by the topic this refers to paper data

and includes for example, records (portfolios), files, teachers' lesson plans, and photographs. The purpose of document analysis was to provide additional information as well as to verify other data. For this study, teachers' portfolios were analyzed in an attempt to verify information from interviews. This assignment was carried out on three schools instead of four schools that had been planned for the study. The usage of documentary analysis was negotiated by the researcher through the school principals.

Analysis of documents was undertaken on available documents that were given to the researcher. These entailed the policy documents based on planning, implementation, and assessment, minute books for the learning area meetings, as well as the Grade nine Technology Education textbooks.

### **3.6 DESCRIPTION OF THE POPULATION UNDER STUDY**

Roscoe (cited in Mouton, 1996, p.134) defines the population as a "collection of objects, events and individuals having some common characteristics that the researcher is interested in studying". The population in this study was chosen for the following reasons: It would be easy to conduct this small scale research in the research sites, which were the three Senior Secondary Schools that were situated in the district that the researcher worked for as a Subject Advisor. These schools were situated in different areas, rural, township, and semi- urban areas and they fell under the same district, namely King William's Town. This was done in order to understand Grade nine teacher practices from different perspectives.

### **3.7 SAMPLE AND SAMPLING**

Bailey (1994) defines a sample as a subset of the total population. The sampling plan therefore describes how the sample or subgroup is to be selected (Aaker & Day, 1990). The researcher used purposive sampling to identify the research sites and the targeted participants. Purposive sampling is a non-probability sampling method (Saunders, et al., 2003). For this type of sampling, the researcher relied on experience, ingenuity to deliberately obtain units of analysis in such a manner that the sample they obtain may be regarded as being representative of the relevant population (Welman, Kruger & Mitchell, 2007). According to Maree (2007), purposive sampling allows the researcher to select participants because of the defining characteristics that makes them holders of the data needed for the study

The study was conducted in the King Williams Town District. It was where the researcher was working as a Subject Advisor for Technology Education and was able to identify the problem. Four teachers from four schools, one per circuit, were selected. The more the number of participants involved in the study, the better opportunities of the researcher for extensive probing of every single respondent to express his or her detailed experiences on the topic. The responses explored could be based on the results of the participants' answers from the case study. The teachers selected might be reflecting different levels of employment in the schools such as the duration of their employment in the learning area, their status of employment (permanent or temporal) and also their qualifications in the learning area as these might contribute towards the implementation of their teaching and learning instructional practices in Technology Education.

These schools were chosen because of their proximity from where the researcher was working, and that it would be convenient in all aspects for the research processes. In addition, these schools were in the same circuit and the researcher had established good professional relationships with the circuit during her advisory period. These schools showed an interest in the possibilities of the study as well as willing to refine or improve their teaching and learning practices in Technology Education.

The researcher was introduced to the participant teachers a few weeks before the commencement of the study. This gave the researcher the opportunity to explain the study to the participant teachers, to answer the questions, to allay their concerns and to obtain the participant consent.

### **3.8 NEGOTIATING ENTRY INTO THE RESEARCH SITE**

The researcher used the education district office and the principal at each of the schools as gatekeeper (Saunders et al., 2003). This was to ensure that access to the site and the research participants were secured and that the provisions in the department research policy were adhered to (see DoE, 2007: research in school policy). To achieve this, letters were written to the Education District Office (see appendix A) and the principals (see appendix B) informing them of the research and soliciting their cooperation. In addition, each of the teachers signed a consent form (see appendix C) indicating that they were taking part in the study of their own free will.

It was only after their permission that the field work began. The gatekeepers were essential because they were the point of introduction of the researcher to the target

participants. The gatekeepers would help to remove prospective obstacles that would otherwise inhibit the investigation.

To make provision for data collection, letters were delivered to each school involved in the study and the leaflets with information about the study handed to teachers at the four schools and the Education District Office (see appendix A). This was accompanied by response slips which were requesting teachers to participate in the study (see appendix C). The researcher further went out of her way to physically contact the schools and personally explain the purpose, procedures and processes to be followed when conducting the study.

### **3.9 DATA ANALYSIS PROCESS**

Data analysis is the process of systematically searching and gathering the interview transcripts, field notes and other materials that the researcher accumulates during data collection in order to increase his or her understanding of the phenomenon and ultimately to be able to present what have been discovered to others (Bogdan & Biklen, 1998:150). Hence the culminating activities of qualitative inquiry are analysis, interpretation and representation of the findings (Patton, 1990:371). Data analysis is a process of bringing order, structure and interpretation to the mass of collected data which results in the production of patterns, themes, constructs and inferences.

In this study, qualitative data consisted of field notes and transcripts of interviews. The analysis procedure involves the reading and re-reading of the field notes and interview transcripts (Maykut & Morehouse, 1994:123). Thereafter, significant words, sentences

and paragraphs of phrases were underlined and grouped under suitable headings. As data emerges, relevant extracts of the text were then grouped under themes, which were subsequently clustered into categories to provide systematic meaning (Hatch, 2002, p.148). Extracts from the raw data were selected and either paraphrased or quoted to illustrate the patterns. Findings of the analysis are set out in Chapter Four.

Data for the study was conducted as follows:

### **3.9.1 Main study**

Data for the study was conducted using three data collection techniques as follows:

#### *(a) Semi-structured interviews*

During the interview sessions, the researcher read the topics exactly as written. The questioning allowed room for the participants to give out their thoughts and feelings about the topic in question. Where there was brief response, the researcher would ask the participants to explain more. The researcher was more attentive to the responses from the participants so that she could identify new emerging lines of enquiry that are directly related to the phenomenon being studied. Generally, the participants were keen to respond to the interview questions on their personal background, their experiences and challenges in the teaching fraternity.

The flow of the interview rather than the order in the guide, determined when and how a question was asked. Depending on the responses from the participants which on many occasions required probing as the interview progressed, a question previously planned for later in the interview was sometimes asked earlier. The researcher noticed that the

participants often answered a question before it was asked. This happened during questioning and/or probing. In such situations, the researcher skipped the already answered question. The scheduled time for the interviews varied according to the individual participants. The variation of time taken depended on how the interviewees were able to express themselves and also probing from the researcher. The interviews with the participant teachers were conducted in English and took place during school hours.

*(b) Direct Classroom Observation*

The researcher applied direct observation method. In the opinion of Wagner and Turnery (1998:15) this method entails observing the participant on his or her place in the production process. In this study, the researcher employed the non-participatory-observation approach, where the researcher makes her presence and objectives known to the group being studied (Frankfort-Nechmias, 1992, p.275). Observations focused on teacher learner practices, like availability of resources teachers claimed to be using to make effective teaching and learning practices, their interaction as well as learner participation during the activities.

Observations took place during teachers' planned periods for Technology Education learning area. During this time the researcher observed if the participant's instructions about the lesson are clear enough to be actioned by the learners. The researcher also observed the use and the relevance of the resources as well as the interaction of the participant teacher with her/his learners during the activity. The researcher saw it important to observe how the learners shared their ideas among themselves about the

topic as well as their practical contributions towards their group activities. At the end of the observations, the information was captured together with the interviewees' details.

*(c) Document analysis*

According to Brown and Dawling (1998), documents are an outcome of everyday activities. They therefore provided the researcher with the sort of data that are most likely to be used in answering the questions posed by the topic. This refers to paper data and includes for example, records (portfolios), files, teachers' lesson plans, and photographs. The purpose of document analysis is to provide additional information as well as to verify other data. For this study, teachers' portfolios were analyzed in an attempt to verify information from interviews. This assignment was carried out on three schools instead of the four schools that had been planned for the study due to time constraint caused by the instability at schools during the National strike. The usage of documentary analysis was negotiated by the researcher through the school principals.

The researcher analysed the policy documents, namely, the learning programmes, work schedules, how do they plan their lessons, and the assessment tools, minute books as well as textbooks. The researcher believed that all their teaching and learning practices should be based on education policies that mandate them to plan, implement and assess.

The minute books are the documents that are expected to give the true reflection of the decisions taken before the implementation, the reflections, as well as the support or modifications as the way forward after the findings on teaching practices. It was

identified by the researcher that meetings were held except that not specifically meant to deal with Technology Education issues that could lead to improve Grade nine teaching and learning practices.

The types of textbooks used seen as the documents that could not assist the teacher participants dealing with the new learning area, besides the fact that they were not sufficient enough for the number of learners.

Therefore, documentary analysis focused on finding out if the policies based on documents are being understood, implemented as well as assisting teachers in improving the quality of teaching and learning.

### **3.10 DATA ANALYSIS**

Data analysis is any approach, qualitative or quantitative, to reduce the complexity of the information and to come to an interpretation of what is real and what is not real (Martin, Bauer & Gaskel, 2000). As advised by Punch (2003), the researcher, after having collected the data, went back to think about the central role of the research questions. The researcher, after having collected the data began to summarize, deduce and create the variables. After having created the variables the researcher showed the distribution of the variables across the samples. In doing so the researcher was able to realise which data was needed.

### ***3.10.1 Analysis of data from the interviews***

The researcher, after collecting data by means of interviews, sorted them according to themes. The main task in the data analysis stage was to identify common themes from participant's description of their experiences (Leedy & Ormrod, 2005). The researcher organised, categorized, indexed and arranged the data in such a manner that she was able to identify the essence of the content (Collins, du Plooy, Grobbelaar, Puttergill, Terre Blanche, van Eeden, van Rensburg & Wigston 2000).

It was noted by the researcher that some of the aspects shared by the participant teachers during the interviews were reflected during the classroom observations, for example, there were insufficient relevant teaching and learning resources in their classrooms. The teaching instructional practices they claimed to use when interviewed were not properly reflected during the classroom presentations, some of them implemented but inappropriately. Learners seemed, to the researcher that they were not used to interact with their teachers of which during the interviews some of the teacher participants shared their active interactions with their learners.

### ***3.10.2 Analysing data from the classroom observations***

In analysing the data from the observation the researcher compared and contrasted the data she had gathered from different observations. She sorted them and connected them to the themes that were identified in the interviews. Chiseri-Strater & Sunstein (2006) argued that sorting data involves making connections among several related sources as in qualitative research. This means that no single piece of data stands alone by itself as evidence.

It was evident by the researcher that there was no correlation between what the teacher participants said during the interviews and their presentations in the classrooms. For example, during interviews the researcher was told that learners were not participatory and willing to share what they thought, but to her surprise learners proved to be so argumentative and manipulative throughout the activities. At the end of the classroom observations, it was evident that learner performance, during the classroom activities depends on the instructional practices that are used by teachers.

### ***3.10.3 Analyzing data from the documentary analysis***

The documents that were used as secondary sources in this research were policy documents such as meetings minute books and the Technology Education textbooks. The researcher made notes by summarizing information based on these documents. The summary of these documents helped the researcher to interpret them. In interpreting these documents the researcher was able to identify related themes from different minutes. These themes were connected to the themes that had already been identified in the other research methods. By analysing the documents the researcher was able to get the detailed information related to teaching and learning instructional practices used in Grade nine Technology Education. Leedy & Ormrod (2005) noted that data analysis in the case study involves the organisation of the details about the case, categorization of data, and interpretation of single instances, identification of patterns.

In analysing the data, the researcher discovered that what was prepared in teacher participants' lesson plans mostly had not been reflected during their teaching practices. For example, the use of resources planned perfectly, relevant in the preparation but

were unable to do so when it came to practicality as well as not sufficient time given to learners to discuss and explore their knowledge and understanding about certain aspects during the presentations.

In conclusion, in some instances, the participants felt nervous and unstable with the process as it was to reveal that they had the documents that were not read and implemented. It was also making them to be uneasy to be discovered that they mainly did not hold meetings for the subjects that they were teaching, meaning that there was no proper moderating of the work done by their Head of Departments so that they can support their subordinates. They did not plan before they implemented as well as reflections after implementation and assessment in order to identify areas of improvement. The issue of finding out about textbook that they used was pleasing to them as they had shortage and the few that they had was sometimes irrelevant for the learning area.

### **3.11 TRUSTWORTHINESS**

In qualitative research, issues of trustworthiness suggest that the research is credible when those familiar with the topic of the study recognize the findings to be true. It is essential to address trustworthiness measures in this research. Trustworthiness of the findings was addressed by means of Guba's model of trustworthiness as presented by De Vos et al (1998). They present them as follows:

- (a) *truth value*: this asks whether the researcher has established confidence in the truth of the findings for the participants and the context of the study. In this study, truth value was achieved by using the triangulation.
- (b) *applicability*: this refers to the degree to which the findings can be applied to other contexts and setting or with other groups. For this research, applicability can be achieved when referred to limitations that have already been mentioned in the previous chapters.
- (c) *consistency*: this refers to whether the findings would be consistent if the enquiry were replicated with the same participants or in a similar context. In this research, consistency can be achieved if the same inquiry can be replicated, using the same methodology with the same research design.
- (d) *Neutrality*: is the freedom from bias in the research procedures and results. The strategy accomplished explained in the following section.

## **3.12 VALIDITY AND RELIABILITY**

### **3.12.1 Validity**

‘Instrument validity’ refers to the extent to which an instrument measures what it intends to measure. Validity is the complement to reliability and refers to the extent to which our measure reflects what we are expected to measure (Anderson, 1998, p.13). Anderson continues by saying that validity, to the qualitative researcher generally, refers to the extent to which the stated interpretations are in fact true (Anderson, 1998, p.13). Blanche, Durrheim & Painter (1999) further explained that validity refers to the degree to which the research conclusions are sound. The researcher, therefore, ensured that the

data collection instruments that she designed would measure the implementation of teaching and learning practices in Grade nine Technology Education classrooms. To ensure validity, the researcher used tried and tested measures and statistical techniques to ensure that accurate conclusions can be drawn from the research results.

### **3.12.2 Reliability**

Van den Aardweg (1993, p.201) defines reliability as a statistical concept that relates to consistency and dependability. According to Descombe (1998, p.22), the criterion of reliability is whether the research instruments are neutral in their effect and would measure the same results when used with the same people. In this study, reliability refers to the degree to which the results are repeatable (ibid.). This was ensured by the consistency of a measure of a concept because the participants scored similarly on reliable measures on numerous occasions. Through this form of measurement, the accuracy and conclusiveness of the findings were indicated.

## **3.13 ETHICAL CONSIDERATIONS**

Tuckman (1992, p.15) states that the issue of ethics is an important factor for educational researchers, since their subject of study concerns the learning of human beings. The nature of such research may disturb or embarrass those who are participating in the research.

Ethics embody individual and communal codes of conduct based upon adherence to a set of principles which may be explicit or implicit, abstract and impersonal or concrete and personal (Zimbardo (1992, as cited in Cohen and Manion, 1994, p.362). As Mile

Hierberman (cited in Kolagano, 2000, p.65) said that we cannot focus only on the quality of the knowledge we are producing, as if its truth were all that counts. We must also consider the rightness and wrongness of our actions as qualitative researchers in relation to the people whose lives we are studying, to our colleagues, and to those who sponsor our work.

In the opinion of Leedy and Ormrod (2005), within certain disciplines namely the social sciences, education, criminology, medicine, and similar areas of study-the use of human subjects in research is, of course, quite common. And whenever human beings are the focus of investigation, we must look closely at the ethical implications of what we are proposing to do. Most ethical issues in research fall into one of four categories: protection from harm, informed consent, right to privacy, and honesty with professional colleagues. This section raises concerns related to each of these categories and also describes the internal review boards and professional codes of ethics that provide guidance for researchers.

Researchers should not expose research participants to undue physical or physiological harm. As a general rule, the risk involved in participating in a study should not be appreciably greater than the normal risk of day-to-day living. Participants should not risk losing life or limb, nor should they be subjected to unusual stress, embarrassment, or loss of self-esteem. In cases where the nature of the study involves creating a small amount of psychological discomfort, participants should know about this ahead of time, and any necessary debriefing or counselling should follow immediately after their participation.

### ***3.13.1 Anonymity and confidentiality***

This refers to the protection and respect given to the participants in the study (Blanche et al, 1999). In order to protect the privacy of the participants in this study, a code system was used to conceal their identity and interviews were carried out in the privacy of their schools or homes. Participants' confidentiality was not compromised, as their names were not be used when collecting data. The researcher made sure that no private or secret information was exposed because the privacy of the participant was considered or respected. The participants were assured of confidentiality and requested not to give their names when responding to the interviews. McMillan and Schumacher (1997:195) state that information about subjects must be regarded as confidential unless otherwise agreed on the through informed consent. Only the researcher had access to names and data.

### ***3.13.2 Informed consent***

In Leedy and Ormrod's (2005:217) view, research participants should be told the nature of the study to be conducted and be given the choice of either participating or not participating. Furthermore, they should be told that if they agree to participate, they have the right to withdraw from the study at any time. Any participation in a study should be strictly voluntary. A dilemma sometimes arises as to how informed participants should be. If people are given too much information, for instance, if they are told the specific research hypothesis being tested they may behave differently than they would under more normal circumstances. A reasonable compromise is to give potential

participants a general idea of what the study is about (e.g. This study is about a study of Technology Education instructional practices in Grade nine classrooms).

The researcher gave the participants sufficient information about the study in a simple way so that they understood what was involved thereby enabling them to exercise their right to make an informed decision whether or not to participate in the study. She gave them an opportunity to ask questions about the study to help them decide if they want to take part. All the teachers participated in this study expressed their willingness to participate and appointments for interviews, classroom observations as well as document analysis were made. All of them preferred to be interviewed and observed at their schools during their teaching hours.

### **3.14 SUMMARY OF THE CHAPTER**

This chapter has outlined the Methodology of the study. The interpretive paradigm and Case study research design was used in this study. Data collection techniques included semi-structured interviews, direct classroom observation and documentary analysis were used to collect data. The discussion also focused on the population and sampling procedures, negotiated entry into research sites, data collection analysis, trustworthiness, validity and reliability, and ethical considerations. The next chapter focuses on the presentation of data.

## **CHAPTER 4**

# **THE PRESENTATION, THE ANALYSIS AND THE INTERPRETATION OF THE DATA**

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### **4.1 INTRODUCTION**

In the previous chapter, the researcher collected the data through the use of semi-structured interviews, direct classroom observations and the documentary analysis. These instruments aimed at responding to the research questions posed by this study that aimed at investigating Technology Education teaching and learning practices in Grade nine classrooms. This chapter presents, analyses, and interprets the data gathered as per the previous chapter.

For the purpose of this study, the researcher refers to each of the participant teachers and their schools by the first three letters of the alphabet. For example, the researcher referred to participant A as PA from school A. Firstly, the researcher analyses the data by coding the classroom observations according to an instructional format, the teacher's role, learner's behaviour and the expectation of learner's knowledge and understanding of Technology Education. The codes were clarified by defining each of them. Secondly, the researcher presents the profiles of the participants and the sites as well as the description of the classroom observations where the research took place. Lastly, the researcher analyses and interprets data generated from documentary analysis and semi-structured interviews.

## **4.2 THE ANALYSIS OF THE DATA**

The analysis of the data was completely qualitative. In analyzing the data, the researcher focused on dimensions of effective Technology Education, the instructional processes, the instructional tasks, the social organizing of learning created by the teacher as well as the teacher's decisions and actions as different from the NCS. This method of accumulating data resulted in a thick description, which proved the basis to an understanding of Grade nine Technology Education teacher practice in the three King William's Town Senior Secondary Schools.

The researcher's analytic procedures used were to bring order, structure and meaning to the thick narrative data, to search for emerging themes, patterns, recurring general statements and regularities in the setting and the respondents chosen for the study and to generate categories. The analysis of the data required disciplined examination while paying careful attention to the purpose of the research. The researcher carefully considered verbal and non-verbal data and applied data reduction strategies to the data.

In analyzing the data, the researcher focused on dimensions of effective Technology Education practice, the instructional processes, the instructional tasks, the social organizing of learning created by the teacher as well as the teacher's decisions and actions as opposed by the NCS. The thick description proved to be the basis to understanding Grade nine Technology Education practice in the three King William's Town Senior Secondary Schools.

#### **4.2.1 Coding of Data**

Data analysis proceeded in stages, i.e during data collection and after data collection. Categories that reflected key features of lessons observed were identified. These categories included planning, content, teaching strategies, cognitive level of content, teacher-learner engagement, connections of prior knowledge, resources, learner tasks, teacher support and classroom environment. For observation of instructional practices, the researcher wrote a summary description of actions and lesson features pertinent to each category. Using the summary descriptions, the researcher organized the results of the teacher observations. Comparisons were then made to look for distinctive common features.

The researcher coded the observations according to an instructional format, the teacher's role, the teacher's focus, learner's behaviour and the expectation of learner's knowledge and understanding of Technology Education. The codes were identified by defining each of them. The researcher drew on the work of Shulman (cited in Ball et al 2008) who also developed codes for interviews. Concepts were identified and organized into categories (e.g. knowledge of the curriculum, principles of OBE, active learning, importance of continuous learning, teacher's role, and learner's role, assessment for learning, equity, context, and content).

#### 4.2.1.1 Coding the Teaching Practice

**Table 4.1: Category description of actions and pertinent lesson features**

|                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Lesson Planning                   | The teacher plans and is well organized for her/his lessons every day. Learners have enough materials for the activities. The teacher is mindful of what students have learnt in previous grades as well as what skills they need to acquire at this grade level. (Hill et al 2004)                                                                                                                                                                                                                                                                                                                                   |
| Engaging Content                  | Teacher's knowledge of Technology Education entailed in the lesson as revealed by its enactment. The teacher provides lessons, activities and tasks that arouse the curiosity and anticipation of the learners, reviews content in a meaningful way, employs many teaching strategies, creates authentic products, uses current events as a context for learning, uses hands-on strategies, and builds excitement when introducing new material. Included is the recording of Technology Education work of the lesson and delivery of Technology Education tasks students risking on. (Department of Education, 2002) |
| Multiple Representations of tasks | To teach a single concept, the teacher uses many different methods to deliver the lesson content. (Artzt and Amour-Thomas, 2002)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Learning by Doing                 | Learners are given an opportunity for hands-on learning. (Geary, 1994)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Scaffolding                       | The teacher models and assists learners when they are struggling to learn new material. (Hodson and Hodson, 1998)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Encouraging Risk Taking           | The teacher encourages the learners to take chances and try new things. The learners get the message that when they try new things the teacher and classmates will support their efforts. (Van                                                                                                                                                                                                                                                                                                                                                                                                                        |

|                                          |                                                                                                                                                                                                                                                                                                                    |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                          | Der Walle, 2010)                                                                                                                                                                                                                                                                                                   |
| Encourages<br>Independence               | The teacher communicates to learners that there are many things they can do on their own, without the teacher's assistance. Learners know that they are to do as much as they can before asking for help. (Department of Education, 2002)                                                                          |
| Manipulative/concrete<br>representations | Learners are given many opportunities to use materials to assist them their learning eg. Suitability of the lesson materials. (Mutemeri and Mugweni, 2005)                                                                                                                                                         |
| Monitoring                               | The teacher constantly assesses learner's engagement, understanding, and behaviour during the course of the day. The teacher constantly monitors the entire class, even while she/he is working one-on-one with a learner. (Jones and Moreland, 2005)                                                              |
| Positive Feedback                        | The teacher takes advantage of many opportunities to give constructive feedback to learners. Her/his feedback is immediate and specific to learner's accomplishments. The teacher uses these opportunities to encourage and gently push the learners to think more deeply. (Jones and Moreland, 2005)              |
| Stimulates Cognitive<br>Thought          | The teacher provides activities and lessons that promote deep processing and higher order thinking skills. The meaning and use of Technology Education language, meaning making using Technology Education language about ways of reasoning, and about Technology Education practices. (Van Der Walle et al, 2010) |
| Stimulates Creative<br>Thought           | In planning lessons, the teacher allows learners to be creative and think in novel ways. (Van Der Walle et al, 2010)                                                                                                                                                                                               |

|                                                               |                                                                                                                                                                                                                                                                                                                                                   |
|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Strategy Instruction                                          | The teacher uses explicit strategy Instruction. Learners are taught many skills and strategies by the teacher modeling and thinking out loud about her process and plan of attacking a problem or question. (Van Der Walle et al, 2010)                                                                                                           |
| Positive Classroom Management                                 | The teacher uses classroom management techniques that are positive, constructive, and encouraging towards her/his learners. When she/he needs to correct a learner's behaviour, she/he does so quickly and privately, getting the learner back on task as soon as possible and with as little disruption as possible. (Van Der Walle et al, 2010) |
| Learner Engagement                                            | About 80% of the learners pay close attention for the entire time the observers are present. (Van Der Walle et al, 2010)                                                                                                                                                                                                                          |
| Teacher Encouragement of learner understanding and reflection | The teacher monitors learner's understanding of the material. She/he probes for answers, allows time for learners to think before answering, provides "wait times" and encourages them to self correct their wrong answers. (Cobb, Wood and Yackel, 1991)                                                                                         |
| Self Regulation                                               | The teacher provides ways for learners to monitor their learning and making the transition independently to some activities after they are finished with their set tasks. (Van Der Walle et al, 2010)                                                                                                                                             |

(Adapted from Dolezal, Welsh, Pressley and Vincent, 2003, p. 258-262)

Categories were developed, merged, collapsed and some were discarded. The coding underwent refinement as a result of what was encountered during the fieldwork.

## 4.3 PRESENTATION OF DATA

### 4.3.1 Demographics

The study comprised three schools from rural, township, and urban areas having different socio economic levels in King William's Town District. Of the three schools, one was extremely well resourced, one was moderately resourced and the remaining one

was considered historically disadvantaged. In an effort to further represent the diversity of the schools in the King William's Town area, the researcher chose two English and IsiXhosa medium schools and one English and Afrikaans medium school. The researcher focused on Grade nine Technology Education teachers and their classrooms as the source to reveal what teachers in King William's Town schools do to facilitate Technology Education teaching and learning. For the study, one teacher from each of the three schools consented to be a participant.

#### 4.3.2 Demographic Characteristics of the participants

**Table 4.2** The demographic characteristics of the participant

| School | Participant | gender | Age Group | Teaching Qualifications                       | Teaching experience | Teaching experience (T.E.) | Employment status | Classroom enrolment |
|--------|-------------|--------|-----------|-----------------------------------------------|---------------------|----------------------------|-------------------|---------------------|
| A      | PA          | Male   | 36-45     | Diploma in Education + B.Ed (Senior phase)    | 11-15               | 6                          | Permanent         | 76                  |
| B      | PB          | Female | 46-55     | Diploma in Education + Hon. Ed (Senior phase) | 21 & above          | 9                          | Permanent         | 94                  |
| C      | PC          | Male   | 46-55     | Diploma in Education (Senior phase).          | 16-20               | 7                          | Permanent         | 126                 |

Table 4.2 illustrates the profiles of the teachers who participated in the study

**Table 4.2** above indicates that the data was collected from the three schools that have been coded as school A, B, and C. One Grade nine Technology Education teacher per

school participated and the total number of participants in the study was three. There were two male teachers and one female teacher. The table reflects that in accordance with the age group, 46-55 years dominated with two participants against one of age group 36-45 years. With regard to their educational qualifications, all the participants possessed formal qualifications range from Senior Secondary Teachers Diploma (SSTD) to Honours in Education degree. Teachers who have participated in the study coded as participants A, B, and C respectively as follows: PA, PB, and PC. PC from school C had obtained a diploma in Education, PA from school A obtained a diploma in Education and a Bachelor in Education, PB from school B had post graduate qualifications in the form of an Honours degree. Apart from the in-service courses that they were offered by the Department Of Education, they did not have formal training or qualification in Technology Education.

In terms of the post levels, two of the participants, namely (PA from School A and PC from School C) were reportedly assistant teachers and the other one, PB from School B was the Head of Department and they were all permanent teachers. PB, as the Head of Department as well as Home Economics teacher, was requested to take Technology Education as there were no teachers to teach the learning area, PB reported. PB highlighted that she took the responsibility of teaching the subject although she knew nothing about it. According to Ball, Thames, & Phelps (2008, p391), not only is teaching elementary Technology Education extremely challenging, but “making instructional learning that support student learning requires teachers who understand content beyond knowing what procedures to use, when to use them and why they work”. In

addition, Van De Walle et al (2010) adds that teachers need to understand how knowledge is constructed and thereby have a sense of how children learn.

Table 4.2 also indicates that in terms of the post levels, PA and PC were Post Level 1 teachers and PB was in a Senior Post of a Head of Department (Languages). All were permanently appointed by the Eastern Cape Department of Education as teachers. With regard to teaching experience, Table 4.2 reflects that the participants varied. For instance, PA had teaching experience of between 11-15 years, PC teaching experience was between 16-20 years and PB had a teaching experience of 21 years and above. With regard to teaching experience in Technology, they almost had minor variations. PA had 6 years, PB had 9 years and PC had 7 years teaching Technology Education.

Table 4.2 also indicates a significant variation in classroom enrolment. PA had 76 Technology Education learners, PB had an enrolment of 96 Technology Education learners, whereas PC had considerably larger class of 126 Technology Education learners. The researcher was also able to probe and find out different reasons why the participants chose teaching Technology Education. PB and PC reported that it was not according to their choices to teach Technology Education except that they had been forced by circumstances, whereas PA claimed to be passionate in teaching the Learning Area.

### **4.3.3 Teacher Profiles**

#### **4.3.3.1 Participant A- PA**

PA was a male teacher in his late thirties. He got his teacher's diploma in Education as well as his first degree based on senior phase. He had been teaching for fourteen (14) years, having eight years in the current school. He was an experienced assistant and permanent teacher. PA claimed to be passionate in the subject and confirmed that training sessions from the Department of Education had equipped him in the subject.

School A is situated in rural area with low cost housing and it is equipped with old classroom furniture. The school was physically divided into two blocks, the first block had five classrooms and the second one with four classrooms. The principal and the staff stayed in one additional classroom which was initially used as a classroom for science laboratory. The electricity was available although it was not well functioning. School A catered for learners from grade1 to grade 9. Learners at this school came from low-income families and that caused teachers at this school to form teacher-learner support group where they had to contribute a certain amount during the pay day to buy groceries for the needy learners sustainable for a month. They were adding more on what was being offered by the School Nutrition Programme (SNP) from the Eastern Cape Department of Education (ECDoE) to the majority of learners. What they were doing improved learner performance as the learners became restless when being hungry. School A had English and IsiXhosa as the medium of instruction nevertheless English was being encouraged as the Language Of Learning and Teaching (LOLT). It was still a challenge as it was not being motivated at their homes and that led to the use

of code switching mostly for the benefit of the learners. The class enrolment in Technology Education was seventy six (76) learners that the teacher teaching the subject felt being overloaded because he taught other subjects as well.

#### **4.3.3.2 Participant B- PB**

PB was a female teacher in her middle fifties. She had been teaching for more than twenty one (21) years. PB was a Senior Secondary school teacher specialized in Home Economics and English. The teacher was permanent and had got her Honours degree in Education. There was no trained teacher for Technology Education and she was requested to teach the learning area as it was related to her specialization. PB was a well experienced teacher due to her age and her experience in teaching profession, as a result she was appointed a Head of Department (HOD) in Languages. By the virtue of majoring in Home Economics, PB was requested to teach Technology. She did not feel comfortable with the learning area but she agreed.

School B did not fall amongst the well performing schools although her school was privileged to be closer to one of the Department of Education institutions. The learners at school B came from the middle-low income families as some of their parents were working at the neighbouring companies, factories or/and institutions. School B was fairly built, having enough classrooms from grade 1 to grade 12. The staff and the principal's offices were next to the administration block offices. She had got an enrolment of ninety four (94) Technology Education learners. English and IsiXhosa were the medium of instruction and English was being encouraged as the school was situated in the township as well as being the Language Of Learning and Teaching (LOLT).

#### **4.3.3.3 Participant C- PC**

PC was a male teacher in his middle forties. He had got his Teachers' Diploma, being an experienced assistant teacher as he had twenty (17) years in teaching fraternity. PC was a permanent teacher. School C was a well established school in middle to high income area of King William's Town. The buildings were still solid as the School Management Team (SMT) always encouraged good maintenance of the school properties as one of their priorities in their responsibilities.

School C was located in an area approximately 10km from King William's Town. The school catered for learners from grade 1 to grade 12. The school was well built and it was categorized amongst the well performing schools as well as well resourced. It had got a class enrolment of one hundred and twenty six (126) Technology Education learners being divided as two classes of 66 and 60 learners. The medium of instruction was English, however, learners' home languages were mostly Afrikaans, isiXhosa and Urdu as the school was situated in urban area, not far from King William's Town. The learners were fluent in English as this school was regarded as one of the Dinaledi schools. Dinaledi means the 'Star' referring to schools with exceptional performance in the entire Province as well as at National level. Because of its remarkable performance, this school was one of the adopted schools by South African Agency for Science and Technology Advancement (SAASTA) situated in Pretoria, which was the implementing partner for the Department of Science and Technology (DST) nationally. This has put this school in a position of being resourced financially as well as physically so that it can be able to conduct special programmes promoting Mathematics, Science and

Technology. Teachers from this school were always getting special training sessions or workshops on the critical subjects so that teacher and learner performance should be improved.

#### **4.4 PRESENTATION AND ANALYSIS OF RESEARCH DATA**

The data generated from participant observational techniques involving intensive descriptions of lessons as well as in-depth interviews provided the researcher with an insight into each participant teacher's practice of Technology Education teaching aimed at answering the question. In this section, the data is presented per research question as follows:

##### **4.4.1 Research question one**

What practices in Technology Education and Technological activity appear to be prevalent among these Grade nine Technology Education teachers?

##### **4.4.1.1 Participant A**

The learners were seated in groups of 5 per table, facing the chalkboard. PA was standing in front of the class while presenting the lesson and was not moving from where he stood. There were posters reflecting the three Technology Education content areas along the walls as well as for other subjects. No other resources available in the classroom and yet the topic of the lesson was on Processing-Food Preservation. The lesson itself encouraged learners to come with a variety of resources from their homes as well as conducting experiments in the classroom. The teacher did not refer his learners to the posters along the walls, of which he was dealing with the practical

subject that needed learners to conduct experiments as well as manipulating objects.

PA probed their knowledge as follows:

*PA: How does the food look like when is rotten?*

*Group 2 Learner 1: Sometimes it looks green or brown.*

*Learner 2: it smells bad.*

*PA: Very good, today we are going to learn about food preservation.*

PA appreciated the responses from the learners but what was said by the learners could have been collected from their homes as a research and done practically in the classroom as an experiment. Technology Education is a practical subject that needs an integration of theory into practice. Posters were the only resource materials that were available along the walls in the classroom but not a single instruction referred to them.

Medium of instruction was not just English because the learners struggled to understand the language of learning and teaching (LOLT) and therefore, PA as well as the learners had to code-switch for the benefit of learners. English, as a medium of Instruction proved to be a hindrance of smooth communication when PA continued probing his learners as follows:

*PA: How did our forefathers and mothers keep their food fresh for a long time?*

*Group 2 Learner 1: salting, mh .....that thing.....I mean salting meat.*

*Learner 2: make it cold.*

*Learner 3: What do you mean by 'forefathers' Titshala?*

*PA: Very good, that means that you share with your grandparents  
at homes.*

It was common for the learners not to answer in full sentences and that caused them to misunderstand the meaning. PA requested his learners to answer in a full sentence so that he could be able to identify their problem. It was not easy for them to do so as they were unable to construct a simple single sentence. The researcher observed that learners knew the preservation methods but they were unable to communicate the knowledge. It was also evident that learners were only being involved by using question and answer method of which the topic that was taught had to engage Technology Education learners in research as well as exposing them to case studies. These strategies were regarded as some of the most relevant strategies for effective teaching and learning in Technology Education.

PA continued moving his learners from the known to the unknown by telling them that there were different methods of preserving food from being rotten and they were not that different from what they had already mentioned namely, pickling, smoking, drying, etc. The researcher expected to see Technology Education learners manipulating teaching and learning resources, relevant for the lesson so that they should have a good experience of conducting an activity. Learners should have been given an opportunity to read stories, articles or extracts from the newspapers. That would make

them to understand different techniques of applying relevant possible solutions to problem scenarios.

Learners were attentive throughout the lesson, responding reluctantly to the questions being asked by PA. There were only chalkboard and textbooks that were used during the presentation of the lesson. Learners were only involved in theory as they had no teaching and learning resources. One learner commented when she was trying to explain more on food preservation methods, she commented "*it is a pity that we have not been requested to bring the samples so that we can conduct experiments, otherwise we are dealing with these things at our homes*". Technology is a hands-on learning area and it is meant for learners to understand that they need to do something for themselves to promote self dependents, reliance, as well as self employment. Smit (2007) supports the above idea by stating that there is a real need for dedicated technology laboratories in schools with relevant equipments or materials.

Rubrics were used as an assessment tool but taken from the textbook. Sometimes such tools do not address exactly what is desired to assess. Most of the Assessment Standards in the rubric were relevant for the activity assessed within the tool. Learners were given time to assess themselves before being assessed by PA who was only able to assess one group for the particular activity. The work that they were involved in was teacher directed although he did not show a sense of responsibility during the process of assessment. They were given a worksheet to fill in the relevant food preservation method next to the written statement. Code switching was used when PA could see that

learners did not understand the instruction in English as a medium of Instruction. According to researcher's observations, that did not work as the explanation was not based on relevant content in context. The researcher observed that PA identified those still struggling in the learning process and be supported by being given more work as remedial opportunity. What the researcher observed was that the remedial work given did not serve the purpose in the sense that the additional work that was given was not supportive as well as scaffolding the identified learners to an expected level of performance.

#### ***4.4.1.2 Participant B***

The learners were seated in interactive groups. Everyone in each group was expected to play a special role during the activities. The posters based on Technology Education were displayed along the walls in the classroom. Projects that were conducted during the previous activities were displayed as well. PA stood in front of the class while he taught. Language of teaching and learning (LOLT) was English and the learners were struggling to understand the lesson. PB had to code-switch for the benefit of the learners. Learners were requested to research about different methods of preserving foods and also to find out the reasons for preservation. What the researcher observed was that although the groups were formed to be interactive groups, each member of the group worked as an individual. There were learners who gathered information from their homes and they were waiting for their teacher to ask them to present. Instead, PB presented the lesson without any reference to the above mentioned resources. After her presentation, PB asked them questions as follows:

*PB: Let us imagine that we knew nothing about these skills of preserving foods, what would happen to our food?*

*Learner 1: It would become rotten.*

*PB: what do you mean by being rotten? Tell me more.*

*Learner 1: Something poisonous, it cannot be eaten if we may eat it that might cause sickness.*

*PB: Very good, you know what you are talking about.*

The learners were interested to reflect on their prior knowledge on food preservation, especially those from the rural areas. They were first given case studies to read but unfortunately not told the reason to read the information. Learners were instructed to conduct experiments on food preservation. They were instructed by PB that they should conduct the experiments at their homes because their time at school was limited. It was a discouraging experience for the researcher to observe learners deprived an opportunity to conduct the experiments while still in the classroom as a collective. There was no time for them to apply their critical as well as creative thinking among themselves, as well as to share different experiences and skills to develop products. They did not have time to enjoy hands-on activities as well as peer education.

PB continued presented that liquids are preserved as well, for example cheese is made from milk and wine, beer and other alcoholic drinks are made from fruits, vegetables and grains. Learners were attentive through the lesson and it was unfortunate that they

were not allowed to integrate what was presented by their teacher with what they could do. They were only allowed to listen to the telling method that was presented by PB.

According to the researcher's observations, assessment strategies could not be applied as there was no clear activity that was done by the learners. PB talked almost to the end of the lesson and the learners were listening throughout the lesson. Learners were given a case study to read but the participant did not make it clear the purpose of the activity. It was observed by the researcher that their teacher was good enough to use the telling method as well as to divorce the theory from practice. It was also evident by the researcher that PB was very good in simply transmitting the information that was not in-depth in reflecting Technology Education knowledge and skills. Questioning techniques were poor in so much that learners were unable to respond to questions relevantly. Barriers for learning were not catered for by PB until being asked by the researcher. She maintained that learners who are still struggling in understanding the learning area are given an extra work in theory and practice as remedial expanded opportunities of which that did not appear in the lesson plan, the researcher commented.

#### **4.4.1.3 Participant C**

The learners were seated in interactive groups. Everyone in each group was expected to play a special role during the activities. The posters based on Technology Education, especially on processes, were displayed along the walls in the classroom. Projects that were conducted during the previous activities based on Structures, one of the Technology Education content areas, were displayed as well. PC stood in front of his

learners when he taught but moved from one group to another when it was necessary. That was normally done when the learners were involved in practical activities. The learners were fairly good in the language command and that had made things easier for PC in his teaching and learning practice.

It was evident by the researcher from the observations that in PC's class, learners' context was important. He placed emphasis on the learners' real life experiences and drew on them often as a way of introduction. As it was already mentioned previously that Grade nine Technology Education enrolment at school C was 126, PC had two classes having 66 and 60 learners. He was teaching in the classroom having 60 learners.

PC taught Technology Education with the topic on wood processing. Learners brought different types of wood that they were requested by their teacher to bring the previous day. PC divided his class into six groups, each group given the role to play. Before PC allocated the activities to learners, he exhibited whole class teaching on different types of wood or their names as well as their origins. He therefore attempted to engage his learners as follows:

*PC asked each learner from each group to take a piece of wood of his/her choice and tell the class its type or name, its origin, as well as what can be made from it. Learners responded as follows:*

*Learner 1: This wood is pine, made from pine tree and its makes furniture.*

*Learner 2: Oak from oak tree, it makes furniture as well. Oak tree is further divided into yellow oak, red oak, etc.*

*PC: very good, well I can see there is a lot that you would like to share. We will finish up during the afternoon classes. Let me wind up this lesson by giving you this case study so that you can read and understand how to protect wood from rotting and weathering. (He distributed sheets of papers to learners).*

The case study was read as follows:

*“Oregon Sales makes solid wood furniture out of Oregon pine and oak. It believes that finishes prevent wood from absorbing moisture and protect it from rotting and weathering. Finishes also improve the appearance of wood. As the name suggests, finishing is usually the final stage in making wood product. Various finishing techniques can be used, for example, staining, oiling, polishing, vanishing, painting, etc”.*

PC called learners from each group to read the case study. All other learners listened attentively and they had to answer the following questions:

*PC: What is the story talking about?*

*Learner from group 3: The story is about different types of wood and the strengthening techniques*

*PC: What are the strengthening techniques used for?*

Learners responded quite well because the lesson was based on what was being done by their parents at home. In groups of six, learners conducted experiments on the resistance to water and heat, with and without finishing techniques namely, vanishing, painting and polishing. Each group was instructed by PC to complete a given worksheet, summarizing the information gained from the above activity.

The researcher observed PC giving instructions to his learners, sometimes repeating if they were still not clear. The learners were being observed by the researcher as cooperative as well as interactive throughout the activities. The researcher observed them manipulating different types of wood so that they can see or feel their properties as well as their uses. They were busy painting, vanishing, and polishing some of the wood pieces preparing for the experiment. PC was moving in between the groups looking for cooperation as well as constructive ideas or suggestions shared by learners amongst their groups. The information that they got from the lesson and its activities made them to be confident to do other related activities at their homes for more practice and the acquisition of knowledge and understanding of the subject. It was evident by the researcher from this lesson that PC was well prepared for the lesson as he gave learners variety of opportunities to perform various activities.

After the learners had brought the resources from the research, they had to complete a given worksheet summarizing the information gained from the activity. They assessed themselves as they were moving from one resource task to another. Learners were given a capability task (project) as a formal task to do as follows:

*Design, make and evaluate two wooden spoons, a vanished and an unvarnished spoon that will be able to withstand stirring force and be resistant to water and heat.*

**Specifications:**

- The two spoons should be both wooden.
- One should be vanished and another one unvarnished.
- They must be 25 cm in size (15cm long and 10 cm in oblong shape)
- They should be strong enough to sustain stirring force.
- The spoons should be resistant to water and heat.
- They must be safe to use.
- They must be well finished and aesthetic.

PC used the rubric that was designed as Project Portfolio assessment tool to assess the final products. The worksheets were utilized to record findings from the experiment as well as tests. PC had so see to it that the tools addressed exactly what was desired to assess. In some resource tasks, learners were given time to assess themselves, using checklists and worksheet for example, before being assessed by their teacher, using rubric for a project as well as memorandum in case of tests. PC was only able to assess one group at a specified time when using project portfolio rubric as it was assessing an overview of the work done.

The researcher observed that learners from this school proved to be good in language command as their school was situated in the urban area. PC maintained the fact that

learners who are still struggling in understanding the learning area are given an extra work in theory and practice as remedial expanded opportunities.

The observation in three classrooms provided evidence of the different ways in which the teachers and the learners interact. The focus of the lessons in all the classes was to demonstrate, provide practice and to check on the learners' progress. All of the participants were there to encourage the learners to explore different methods for solving problems or to probe for underlying meanings. The learners in all the classes tried their best to follow processes, procedures as well as systems during their activities as Processing is one of Technology Education content areas. Language Of Learning and Teaching (LOLT) for the learners as well as content knowledge and teaching practice for the teachers were still lacking.

#### **4.4.2 Research Question two**

What are the practices of teaching Technology Education that could best facilitate Technology Education learning in Grade nine?

The researcher drew on the data obtained from the interviews in order to address research question two. In-depth, recorded and transcribed interviews, as well as documentary analysis allowed the researcher to develop a better understanding of the meanings teachers held about the practices of teaching Technology Education that facilitate Technology Education learning. The researcher, therefore, intended to use this section to collaborate the evidence received from the participants (Maree, 2007). The focus was also on all written communications that shed light on the phenomenon being

studied (Ibid). Documents used include policy documents, minute books for Technology Education meetings, as well as textbooks.

All the participants described their prior knowledge and understanding in Technology Education as theory. Participant A said:

*I was convinced by one of my colleagues who were already teaching Technology Education that there is nothing different from what we have been doing in Home Economics and other Technical subjects, I can teach the subject successfully.*

When asked about their prior conceptual understanding of the subject, the interviewees' typical responses reflected uncertainty as what they said was not from the books or training sessions but from their colleagues. When asked to share their perceptions of Technology Education teaching, the Participant B explained that if Technology Education is regarded as the same as Technical subjects, they would not have any problem. PC responded in the interview by saying that:

*Well, I really do not have any experience with the conceptual methods to teach Technology Education so I just assumed to teach the way I taught Mechanical Engineering as it is claimed to be the same as Technical subjects. What worries me is the issue of Mathematics and Science background that is claimed to be*

*needed when teaching the learning area. Anyway, the pedagogical content knowledge I got from the Teachers' training college will assist.*

The teachers' responses confirmed that they all came from traditional Technology Education known as Technical subjects, background of direct instruction of content. All the participants admitted to limited exposure of open ended questions, active learning or Technology Education communication.

All the participant teachers participated in this study were the Grade nine teachers. Therefore, they had a good background of teaching the level except that, according to researcher's observations, they fairly applied Technology Education instructional practices. Technology Education is a new learning area/subject however; it has a background of Indigenous Knowledge Systems as well as Technical subjects. Those are the advantages that could make teachers teaching Technology Education not to be totally out of context in the subject. But the above mentioned areas cannot make teachers teaching Technology Education claimed to know and understand the content and methodology of the subject in totality. Observations of their Technology Education teaching practices and their responses in their interviews verified that there were substantial gaps that affected their instructional practices.

Policy documents were one of the data sources that the researcher was guided through the interviews to understand the definition, the purpose as well as the unique features

and scope of the learning area. These documents were used to explore discussions, conceptualization and policies around teaching and learning practices. When the interviewees were asked about planning by the interviewer, PA responded as follows:

*PA: I cannot tell lies, I really have problem in planning. I do not remember getting a well structured training session in planning. I just teach as I wish, being assisted by my teachers' course training.*

The Technology Education lessons observed by the researcher were not encouraging. The researcher was perturbed by the uninspiring instructional practices in two of the three Grade nine classes. According to researcher's observations, the participants theorized the instructional practices as a result, they were unable to apply them during teaching and learning practices. Based on the observations of the lessons, the researcher asked to look at all the participants' lesson plans. The planning for instruction was very sketchy. Their lesson plans were made up of words that did not translate into action in their teaching. PB's lesson planning is an example of this:

- 1) Presentation of a lesson*
- 2) The aim of the lesson: learners can be able to identify different types of foods.*
- 3) Observation- Learners can work with foods*
- 4) Theory and practical presentations*
- 5) Recording- Different types of foods in worksheets*

The lesson plans were very revealing. It was clear to the researcher that the respondents were not skilled in planning. Their content knowledge made it difficult for them to decide on relevant content and how to teach it. The teachers needed to have an understanding of how do children learn in order to make instructional decisions, (Van der Walle et al, 2010) and (Anthony and Walshaw, 2009). Concurred with the above view is Sachs (2003) who maintained that teachers need to understand their practice and what would make it more successful.

Commenting on how he plans his lessons, PC said that he consulted the new Department of Education lesson plan documents and follows them. It was evident to the researcher that his planning was poor, incomplete, and meaningless. The lesson plan documents made available to teachers by the Provincial Education Department are intended to be adapted by the teachers to suit the needs of their classes. The lessons are designed towards meeting learning outcomes and assessment standards for Technology Education. PA demonstrated no initiative towards making the lesson authentic by interconnecting his learners' context.

The researcher was curious as to how the individual teachers used their freedom and creativity to plan Technology Education lessons for their diverse learners. Two of the three participants said that they relied on the lesson plans from the Provincial Education Department, while the other one said that in their school they planned as a grade. The evidence reveals that, while the Provincial Education Department lesson plans were intended as a guide to assist the teachers, teachers have become dependent on them

either as a result of their lack of confidence in what to teach and how to plan for teaching or are unconcerned about the learners in their care.

The researcher identified a missing link between the lesson that PA taught and the planning presented to the researcher. His lesson failed to correspond with what he taught. In addition, the planning said very little about Technology Education. The only indication that the planning had something to do with Technology Education was the following two points:

*Knowledge: What do we mean by 'preservation'?*

*Skills: How to preserve food?*

From the participant's response in an interview, the researcher realized that it was also common practice in many schools not to plan as a grade, but in the case of one of the participant teachers, lesson planning for the core learning areas at her school were planned and executed in a uniform way in all the classes. According to PB, the content, pacing, tasks as well as their assessing were all uniform. The reasoning behind this was that with the demands made on them, sharing for the teaching of the particular concept lightened the workload. Clearly, this was in direct contradiction to the philosophy of OBE based NCS, that of being learner- centred. In chapter two, the researcher put forward the expectation of the NCS that teachers "know and structure learning opportunities appropriate to the needs of the learner" (Department of Education, 2003, p.25).

The implication is that each teacher is responsible for translating the LOs and the ASs of Technology Education learning area into specific classroom experiences that are worthwhile and challenging to the learner.

The researcher studied all the lesson plans for the lessons observed. The participants' grasp of Technology Education knowledge for teaching was lacking. The respondents were unable to translate the assessment standards into engaging content that arouse the learners' curiosity (Kyriacou, 1990). In the interview all the respondents responded that they were pleased that their lessons were successful and they had achieved their outcomes. To the question "What are the indications that you have or have not achieved your outcomes?" The common responses were:

*The learners enjoyed the lesson.*

*The learners were able to answer the worksheets.*

*They answered the questions.*

The emphasis was on general participation rather than on what the learners learned in terms of developing Technology Education understanding and skills. When asked by the researcher about the significance of the Learning Area meetings as the guide for effective teaching and learning, PC responded as follows:

*PC: We do have meetings but not specifically for Technology Education but for the whole department. It is not easy to identify the critical issues in Technology Education.*

*PB: We were not used to record the minutes, it depends. It was not our tendency to revisit some critical issues that we dealt with, instead we forget it.*

It was evident to the researcher that the minutes being recorded during the Learning area meetings were not taken seriously. Subject meeting is important as it is meant to check the progress within the Learning area so that knowledge gaps could be bridged if necessary. The researcher saw it as the support mechanism.

Concerning the textbooks as one of the data sources, participant B responded as follows:

*We believe that textbooks add more value and quality to teaching and learning practice but due to their shortage and unavailability, that was not achieved effectively.*

*PA: I do not remember us being offered training for the textbook usage during the presentation of the lesson as we are dealing with the current curriculum.*

The participants' responses confirmed that teachers are still lacking to know and understand the manner that they are expected to use the textbooks. This sometimes makes them not confident enough to teach as well as assisting learners in teaching and learning practice effectively. Responses were elicited from the participants regarding

their understanding of what the NCS termed “effective teaching” in Technology Education:

*PA: Effective teaching is to teach learners all that they expect you to teach especially about their life experiences.*

*PB: I think is to make them to be able to solve problems about their lives and to organize resources in solving those problems as groups.*

*PC: We need not to tell our learners everything. They have to learn to discover things for their own lives. Technology Education is about solving problems.*

The range of vague responses from the participants revealed the uncertainty prevalent among participating Grade nine teachers with regard to what effective teaching looks like. The NCS is unambiguous with regard to what effective Technology Education instruction is (Department of Education, 2003, p.25).

The participants' lessons pointed to a lack of understanding of the NCS. Regarding their limited understanding of the basic principles of the expected methodology and how their understanding of the principles translates into the implementation of NCS, the teachers were uncertain. The three participants replied in a similar vein. The participants attributed the blame to the two inadequate training sessions on the NCS from the Education Department. According to PA, one of the training sessions was an

introduction to the curriculum policy documents. Not much attention was given to questioning their understanding of the documents. This had resulted in undirected lessons, with simplistic and shallow content in all the lessons observed. The researcher found the participants' knowledge of the NCS superficial and this often resulted in misinterpretation.

One of the participants said that their school enlisted the services of private professional curriculum experts to assist them come to terms with the requirements of NCS. However, their teaching practice did not reflect that.

Based on the observation of classroom practice, the researcher raised the issue of how the participants cater for diversity in their classrooms. From the responses, it would appear that the respondents are unsure as to how to support the diverse learners in their classrooms. When the researcher addressed the issue, all the participants immediately commented on the slow learner, the teachers did not consider diversity ranging from the gifted learners or the learners from the problematic socio-economic circumstances to the learner with physical and mental challenges. The responses showed that the participants have not grasped on the basic tenets of OBE- the equity principle. Responses were:

*PA: Repetition and the slow pace in doing things assist in making them to understand. Sometimes, giving them an extra work and assist them.*

*PC: If they have not finished their work and I suspect that the work might be difficult for them, I give them other activities of their level.*

The challenge for Grade nine Technology Education teachers is to ensure that their Technology Education instructional practices facilitate Technology Education learning and help their learners develop technologically (Van de Walle, 2010). High quality Technology Education instruction focuses on teacher's knowledge of important content as well as coherent connections among lessons designed to achieve important Technology Education goals, teachers' attention to how learners learn, the use of different teaching strategies, the learning context, the learners' engagement in Technology Education tasks (Kyriacou, 1990).

#### **4.4.3 Research Question three**

What teaching strategies are employed by these Grade nine teachers in their classrooms?

The analysis of the data obtained from the classroom observations, as well as interviews was used to respond to question three. The NCS suggests that "the teacher of Technology Education needs to have available, a wide repertoire of teaching strategies that he/she can use effectively to ensure successful learning by all learners" (DoE, 2003a, p.24) The researcher read the lesson transcript and viewed the related interviews responses repeatedly for each of the observed lessons in order to describe the teaching strategies used by the respondents in their Grade nine classrooms. The

classroom observations revealed a consistent picture of teacher practice in Grade nine Technology Education classrooms. Traditional teaching strategies are prevalent in the classrooms. There was no discernible difference in the teaching practice especially of PA and PB from the teaching practices of the past. In all the classes, procedural understanding was valued above conceptual understanding.

Based on the researcher's observations of the participant's practice of teaching Technology Education in the classrooms, the researcher questioned each participant's understanding of 'teaching strategies' and the strategies they use in their Technology Education teaching.

*PB: I request my learners to research before I teach them. Mostly I use telling method because they do not know the learning area. I have to give them more information.*

*PC: My learners like to do projects, therefore they collect available resources to do projects. They also use materials from their homes. I always assist them in making structures.*

The participant's responses were vague, and generally lacked understanding. The only participant who was familiar with teaching strategies was PB. She admitted that while her experience has taught her that using different strategies to teach Technology Education makes for more exciting and meaningful lesson as well as improved learning,

it does take time and effort to think and to plan. She added that teachers often “slip into a comfort zone” and teaching becomes routine, the same way using the same method. From the participants’ inability to explain or to provide examples of strategies that they used in their Technology Education instruction or in the opportunities they provide for their learners to demonstrate their learning was an indication that the teachers’ current practice was very limited. The researcher’s observations in the classes confirmed this.

The participants were in agreement that learners needed to be active. Comment from PA was as follows:

*The learner must be involved in the lesson by doing.*

What was disturbing was that none of them could elaborate on what and how they needed to get the learners involved. Active learning in Technology Education was interpreted purely as working with teaching and learning resources, relating the current problems with the previous related problems that have already been solved in their communities, as well as making them to be able to work as groups or teams. These responses were limited and inadequate. By insisting that learners follow the teachers’ approach to solve problems, indicated the teacher’s limited understanding of the principles of OBE. It was common practice to see the participants prescribe methods in all the classes observed. An example of a response of a participant in an interview:

*PB: Here we have to apply reinforcement skills (paint or vanish) to a wooden spoon, but we cannot do that because we do not have*

*resources. Could you please ask your parents to provide you with paint or vanish and assist you in doing that?*

Attempts to probe for more clarity resulted in accounts of the demands of copious assessment from the Education Department, and large classes, disruptive learners, lack of resources and space, as some the reasons for their methods of teaching. The observed Technology Education lessons did not promote practicality. The content in almost all the lessons was presented in a chalk and talk monotonous manner. In order for learners in Grade nine to develop 'rich' conceptual understanding, they need to see Technology Education products, processes, and systems around themselves. They need physical, hands-on and minds-on experiences of getting the information for their own (researching), being able to apply the information into their designs, make, evaluate, and communicate their end products for being utilized as solutions to problems.

Instead of PC spelling out the steps to work out the problem, the children need to be encouraged to think of ways that make sense to the learner and be encouraged to come up with different ways to solve the problems, or to discuss, argue or suggest alternative methods (Ernest, 1991), talks of using language as the "shaper" of individual minds. Learners need to feel safe to take risks without fear and volunteer their ideas using non-standard approaches. Likewise, teachers need to use learners' responses, whether correct or incorrect to understand how the learners think (Burns, 2005).

The only observable resource that PA always used was the worksheet. The colourful wall chart was meant to be a teaching and learning resource. PA made no reference to the visual representation of food processing on the wall. All the participants in the study resorted to filling out worksheets for reinforcement of learning. The activities were the usual and not cognitively demanding and filling in the answer type activities instead of using many and varied activities to reinforce a concept.

Teaching for equity encourages teachers to be sensitive to the learner's individual differences and to ensure in their Technology Education teaching the teaching strategies, learner activities or tasks are adjusted to "celebrate classroom diversity" (Van Der Walle et al, 2010). However, despite the emphasis on participative learning in the new curriculum, teacher-centred pedagogies of direct instruction, the lecture method and question and answer techniques, were the predominant teaching styles used in the classrooms.

PC had the benefit of modern technology to use as a resource in his Technology Education teaching. He explained in the interviews that most of the Technological resources they have are not relevant for the activities that they engage their learners in. Most of the activities need them to have Technology Education workshop, so that they can use, for example hacksaws, soldering and mixing machines etc. in the case of wood processing as the topic of their lesson. Meanwhile, the technological resources that they had at his school were computer based resources.

PC involved his learners in the collection of different types of wood from their homes for the lesson on wood processing- Wood Finishing Techniques. The learners were familiar with the forests, woods, their properties as well as their use. As an introduction, PC instructed learners to bring different types of wood and named them according to their properties. The resources used by the participant were appropriate for the content that was taught and was relevant to the context of the learners. This practice is in agreement with the NCS who advise that “it is important that learners see the value of the tasks that they are doing”. (Department of Education, 2003a, p.25). Skovsmose (2005), a Mathematician, also talked of bringing the “students’ cultural context into the classroom as a resource”. More importantly, this resource could have been used as a tool to link the Technology Education as well to home experiences with the intention of engaging the learners in Technology Education meaning making.

The table 4.3 below indicates the level of classroom interactions observed in the Technology Education lessons in Grade nine classes. It is adapted from Rogan, cited in Velupillai et al, 2008, p.69.

**Table 4.3:** Levels of classroom interaction

| Levels | Teacher                                                                                                                                                                      | Learner                                                         |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| 1      | Presents content in a well organized, correct and well sequenced manner, based on a fairly designed lesson plan.<br><br>Provides resources. Engages learners with questions. | Learners stayed engaged.<br><br>Respond and initiate questions. |
| 2      | Presents content in a well organized, correct and well sequences manner, based on a fairly designed lesson plan.                                                             | Engages in meaningful group work. Offers contributions to       |

|   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                          |
|---|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | Provides adequate resources. Engages learners with questions that encourage deep thinking.                                                                                                                                                                                                                                                                                                                                                                                                                                    | lessons.                                                                                                                                                                                                 |
| 3 | <p>Presents content in a well organized, correct and well sequences manner, based on a fairly designed lesson plan.</p> <p>Provides relevant resources. Uses teaching strategies that engage the learners. Probes learner's prior knowledge. Learners' activities are structured along the lines of good practice. (Knowledge is constructed, is relevant and is based on applying knowledge in solving problems).</p> <p>Assessment for learning practice.</p>                                                               | Engages in a meaningful group work. Makes own contribution based on concepts learned from engaging in activities. Active discussions pertaining to learning among group members as well as with teacher. |
| 4 | <p>Presents content in a well organized, correct and well sequences manner, based on a fairly designed lesson plan.</p> <p>Provides relevant resources. Uses teaching strategies that engage the learners. Probes learner's prior knowledge. Learners' activities are structured along the lines of good practice. (Knowledge is constructed, is relevant and is based on applying knowledge in solving problems).</p> <p>Facilitates learners as they undertake investigations.</p> <p>Assessment for learning practice.</p> | Learners take responsibilities for their own learning. Active engagement in learning. Constantly questions own, peer and teacher's thinking.                                                             |

Table 4.3 indicates the level of classroom interactions observed in the Technology Education lessons in Grade nine classes. The level descriptors are an indication of the quality of the classroom interaction, with level 1 being interaction where the respondent initiates a question and the learner responds to level 4, where the participant and the learners engage in discussions; learners are encouraged to reason and explain their actions, procedures or answers.

Interaction observed in one of the three classrooms, ie. PA fell into level 1. PB and PC, however, fell into level 2. PB and PC attempted to engage their learners to think deeper in a form of being critical and creative during their activities, especially the class for PC. However, PB group activities were predominantly procedural not meaningful to the learners. There was no evidence of level 3 or 4 activities in the observed classrooms. The researcher draws the data from the interviews based on classroom observations as well as on documents. The interpretation of the findings is therefore documented and is presented below.

#### **4.5 THE INTERPRETATION OF THE FINDINGS**

This research study sought to investigate teacher practices in the teaching of Technology Education in Grade nine classrooms. In analyzing the data, the researcher focused on dimensions of effective Technology Education practice, the instructional processes, the instructional tasks, the social organizing of learning created by the teacher as well as the teacher's decisions and actions as proposed by the NCS. The interpretation of the findings is documented under the following sub-headings:

- The teachers' views of Technology Education
- The teachers' perceptions of teaching

##### **4.5.1 The teachers' views of Technology Education**

Technology Education instructional practice teachers need to focus not on just a singular perspective that is the product. Teachers need to focus on context, the processes and the products. With reference to the definition of Technology Education in the NCS policy documents as quoted in chapter two, NCS advocates a further

description of the view of Technology Education. The researcher refers to the specific aims of Technology Education learning area/subject, requiring the identification of the context, specific processes and specific end products. The identification of these provided the researcher with benchmarks against which the participants' views of Technology Education were measured.

Technology Education understanding is of particular significance, but in conjunction with the processes involved in the formulation of Technology Education ideas. The implication is that the NCS is based on a fallibilistic view of Technology Education and is further conveyed in the definition of Technology Education as a 'human activity'. This is a complete contradiction of the absolutist view that Technology Education teachers always apply when teaching the learning area. The definition points to activities that arise from the human need to question, reason, to logically find solutions. The solutions include the Technology Education products arrived at, the way concepts are developed and multiple procedures to the most efficient procedures are developed.

Clearly, the instructional practice observed in all the participants' Technology Education classrooms indicates an absolutist view of the learning area/subject. Within the absolutist view the teacher is the transmitter of knowledge that the learner needs to learn and master. Rules and procedures are taught in a decontextualised way. The teachers made no reference to how those rules or procedures learnt in the Technology Education class could be useful in daily life. This implies that as Technology Education is the application of Mathematics and Science disciplines, teachers teaching the

learning area did not take that into cognizance by making these disciplines be applicable or practical to suit the human needs. One such example of a lesson observed on wood finishing techniques;

*PC: Just give me all the names of the types of wood that you have collected (the teacher is listing the names on the chalk board).*

*Learners: yellow wood, oak, pine, (He stopped them before they finished and asked them to give him various finishing techniques).*

*Learners: (chorus responses) Staining, oiling, painting....*

*PC: Ok, what you should do is to apply the finishing techniques at homes and bring them back tomorrow.*

In this example, it was also clear that even if the response from the learners was correct, PC only accepted his own version of answers. He did not appreciate what was correct as well as politely correct the wrong answer of which a teacher is still regarded as an authority for right or wrong answer. When they listed the finishing techniques, it was absolute for him even if they were not all listed. There could be learners who would wish to know them all. Learners were not told about the reason for the application of finishing techniques as well as the significance of identifying wood properties before the application. PC made no reference of such questionable concerns. While all these are features of the falliblistic view, the teacher is still regarded as the authority regarding right from wrong, making it an absolutist view (Ernest, 1991).

#### **4.5.2 Perceptions of Teaching**

Based on the definition of Technology Education, according to the NCS in chapter two, Technology Education is defined as the use of knowledge, skills and resources to meet people's needs and wants by developing practical solutions to problems, through processes, systems and products, taking into consideration the social and environmental factors into consideration (Department of Education, 2002).

The teachers' perception of the role therefore can be identified from the type of instructional practices they design for their learners. The researcher argues that the instructional practices ought to be compatible with the definition of Technology Education namely, conducting investigations, problem solving, developing practical solutions using resources, engagement in social and environmental factors that might be affected by Technology Education negatively or positively. The researcher summarized teachers' perceptions of teaching according to the type of activities that they encouraged as well as the type of representations used in their instructional practices. The analysis of the components served as a benchmark to measure the participants' views of teaching.

The NCS has identified instructional practices that are characteristics of effective Technology Education teaching practices. Moreover, the NCS makes it clear that opportunities should be created that challenge the learner to learn. The teacher's role is to have a wide repertoire of teaching strategies that will engage the learners in Technology Education discourse while they investigate and conduct activities that will

make them to communicate the results for problem solutions. Important also is that at all times the teacher knows his/her learners, that is, their different abilities, interests, barriers, etc. and that instructional practices make connections with their real world. The NCS suggests that to promote the development skills, learners need to work out problems where the approach for solving was not so obvious, that required them to reason, reflect and to arrive at multiple possibilities (Department of Education, 2003; Van de Walle, 2010).

In summarizing the teachers' perceptions of teaching, were contrary to the expectations of the NCS, the participants were rigid in their planning. Their perceptions were predominantly that of transmission. Teaching was based on procedures that need to be learnt, practiced and followed. This was evident in the teaching practices of the two participants, PA and PB. The teachers focused on learning to do as opposed to learning to think. The same example given in page 125 is used for different purpose, observed in PC's class as follows:

*PC: Just give me all the names of the types of wood that you have collected (the teacher is listing the names on the chalk board).*

*Learners: yellow wood, oak, pine, (He stopped them before they finished and asked them to give him various finishing techniques).*

*Learners: (chorus responses) Staining, oiling, painting....*

*PC: Ok, what you should do is to apply the finishing techniques at homes and bring them back tomorrow.*

PC's presentation of the lesson did not cater for learner differences. He took for granted that every learner followed what he talked about. He stopped the learners before completing their list of the types of wood because what he was waiting to be said had been said. However, he also allowed his learners to respond in chorus so that he could not be able to identify those who are still struggling in understanding the lesson. He made learners to focus on learning to do without knowing the reason to do for. The learners were instructed to apply the finishing techniques, the reason to do so was not mentioned.

A further indication of the teachers' ability to make Technology Education comprehensible to the learners is to provide teaching and learning resources to help learners make sense of Technology Education, by building on what they know and by providing opportunities for reflective practices, like using deep questioning techniques or problem solving strategies, including the use of language for the development of cognition and cognitive procession. (Van de Walle, 2010; Bodrova & Long, 1996).

However, the participants observed made very little use of the learners' prior knowledge or checked learners understanding through questioning in order to circumvent erroneous conceptions. Two of the three participants observed asked shallow, lower

order questions that required little elaboration or thinking on the part of the learner. For example, one respondent:

*PB: In order to avoid our food become rotten, we have to preserve it. What preservation ways that we can do? I told you that even before, people kept their food fresh. Hands up please.*

Learners need to be able to connect new concepts to what has been learned already. Unfortunately, because the teachers did not make connections to prior learning and prior experiences, it was evident that learners were theorizing the knowledge and understanding as well as the processes. The participants did not encourage the learners to represent their understanding in different or multiple ways to show the kind of connection they made. This was yet another avenue that the teachers neglected to use to facilitate discussions with the learners.

Teachers with an empirical view of Technology Education value practical hands-on activities, embodying the Technology Education ideas that learners must discover. While the participants in the study all talked about hands-on activities, not much attention was given to the selection of activities that would stimulate the development of skills. All the participants in the study displayed empirical perceptions although their lack of emphasis on conceptual understanding distinguished them more in the weaker range (Walshaw, 2009b; Munter, 2009). Although all the participants set many procedural practice tasks, only PC offered the learners manipulative activities to assist with the acquisition of knowledge and skills. Participants A and B taught lessons promoting the

improvising of resources especially that the resources for food technology could be found from their homes.

More emphasis needed to be placed on contextual problems as emphasized by Mathematical expert, Skovsmose (2005), as well as the use of concrete materials not only as a point of departure or as an introduction, but as a practice of teaching to ensure conceptual understanding through active participation but to develop interest and stimulation in Technology Education. According to (Killen, 2005), a significance of constructing Technology Education knowledge and skills is to make of it in everyday life. Department of Education, (2002, p.5) concurs with Anthony and Walshaw, (2009) when stating one of the unique features and scope of Technology as a learning area, that they combine thinking and doing in a way that links abstract concepts to concrete understanding.

In this study, the participants' pedagogical styles were primarily whole class instruction that focused on inquiring knowledge and understanding as well as processes, little emphasis was put on the acquisition of skills. However, it did appear that classroom management was a key issue with all the participants particularly with PB and PC, because of the large numbers of learners in each class. That caused the respective participants to dictate the Technology Education instruction provided. These participants were so concerned about classroom management that they did not consider using hands-on manipulative activities. The effective use of hands-on manipulatives can also promote positive classroom behaviours.

Teachers with connected views of teaching are more skilful in eliciting the individual images that learners have about Technology Education knowledge and skills and how to build on that knowledge. Crucial also is that Technology Education teachers find out what the learners understand, pay careful attention to evidence of understanding how the learners think, what they are having problems with and what kinds of instructional strategies are working “Technology Education teachers gain a wealth of information by delving into the thinking behind students’ answers, not just when answers are wrong but also when they are correct” (Burns, 2005, p.26), all of which would dictate how the work should be paced. These are crucial for the planning and assessment of Technology Education. The participants paid very little attention to observing and listening to their learners in order to use the knowledge gained to support their Technology Education development.

When learners are involved in Technology Education activities, teachers need to engage individuals or groups of learners in Technology Education discussions regarding their design processes. This practice fosters the development of Technology Education communication. PB and PC fairly engaged their learners as groups so that they should gain knowledge and understanding from each other. PA was more of using telling method therefore, he did not give his learners an opportunity to share knowledge among them. The NCS makes it clear that assessment is an integral component of teaching and learning in Technology Education and that assessment is meant to

support learning. (Department of Education, 2003a). The researcher saw minimal evidence of this view among the participants.

Teachers not only need to have sound Technology Education content knowledge but also pedagogical content knowledge (Hill et al, 2004; Ball et al, 2008). The NCS is explicit that teachers need to be “competent”. Bloch (2009) talks about the importance teacher’s mastery of the subject and the curriculum to meet the educational needs of the child. That means that all teachers need to be able to unpack their specific aims, arrange them in order to teach in a meaningful way and have the ability and understanding to cater for the individual learner (Guskey, 2005). Based on the evidence, the researcher concurs with Bloch, that the participants lacked the “core abilities to teach” (Bloch, 2009, p.102).

## **4.6 SUMMARY OF FINDINGS**

This study has found that:

- The lesson observed exhibited features of traditional Technology Education teaching practice.
- Technology Education content knowledge and understanding that was presented in all the classrooms was very superficial and not challenging.
- Pedagogical content knowledge and that was needed for teaching was not evident in their teaching.

- Theory was taught in isolation. Two of the three participants did not encourage learners to make use of the resources available in the classroom.
- When the learners spoke, it was generally confined to the learners chorusing answers or a learner giving a one word answer to the teacher.
- The participants did not check for the understanding or allow the learners wait time to think about the answer or even to probe so that the learners could self correct the answer.
- The learners lack what Hill et al (2004, p.13) called, “curriculum”, what competency levels learners need to achieve in the year as well as what learning is to follow. This is especially important in Technology Education as it is a new learning area/subject.
- The assessment factor still leaves room for improvement as the participants revealed that they were not sure what, who, when and how to assess the activities.
- Some of the aspects, for example, practical activities as well as resources listed in the lesson plans, that were said during the interviews were not reflected during the classroom observations.
- The items in the master portfolios laid out well, having related with what has been planned except that some of learners’ work was not properly followed up in the sense that corrections of the marked work and knowledge gaps not identified.
- All the participants besides PC used a ‘one size fits all strategy’, meaning that the participants taught the whole class without making allowance for differences in abilities or learning styles. That means that they did not value diversity.

## **4.7 CONCLUSION**

The evidence from this study suggests that Technology Education teaching practice in the participants' classes demonstrated that they are enacting the curriculum very differently from the way the curriculum developers intended.

In the final chapter, the findings of the study are described in relation to the theories discussed in the literature review. The implications of the results are also discussed, as well as the weaknesses of the research, furthermore the suggestions for further research.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

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#### **5.1 INTRODUCTION**

In this concluding chapter, the researcher will summarize findings of teacher practices that appear to be prevalent among the Grade 9 Technology Education learners in the King William's Town district, in their effort to facilitate Technology Education learning. The main concern of this research study was to investigate the alignment of Technology Education teaching practices of grade nine teachers with the progressive pedagogy implied in the new curriculum NCS.

In addition, this study aimed to make recommendations to educators to consider developing practice that is relevant. Furthermore, the implications of the evidence of teachers for Technology Education practices in Grade nine are discussed. This chapter concludes with recommendations and outlines the limitations of the study.

A description of effective Technology Education teaching is outlined according to the NSC. The changes in content as well as recommended teaching styles represent a significant departure from traditional Technology Education teaching of the past. The NCS is based on theories of active learning. Experiences that teachers provide in their Grade nine Technology Education classroom should be designed to maximize learning by engaging the learners physically and cognitively. Alternative approaches are recommended, with emphasis placed on the development of conceptual understanding.

## **5.2 SUMMARY**

In this section, several important issues about quality teaching in Grade nine Technology Education classrooms are raised. The evidence from this study of Technology Education instructional practices in the grade nine classrooms indicate that the participants have not responded to Technology Education teaching and learning called for by the NCS.

In investigating teachers' instructional practices in the teaching and learning of Technology Education Grade nine classrooms, the researcher focused on dimensions of effective Technology Education practice, their instructional processes, the instructional tasks, the social organizing of learning created by the teacher as well the teachers' decisions and actions as proposed by the NCS. The description proved to be the basis to understand Grade nine Technology Education teacher practice in three King William's Town Senior Secondary schools.

For many teachers, including the cohort, the deep paradigm shift in pedagogy from their earlier behaviourist-influenced traditional training of executing the curriculum by specifying objectives and measuring observable behavior, to this new curriculum, with teaching practices that encourage learners to become active participants, explore open-ended problems, where pedagogy is characterized by high levels of engagement are practices, is proving to be a challenge.

Researcher has suggested that teachers' educational views and experiences filter for their instructional and curricular decisions; these can either promote or impede change (Pawl, 1992).

When compared to the prescriptive curriculum where the teacher was a passive recipient knowledge, the model of instructional practice proposed by the NCS is a progressive one. Research confirms that the teaching practices advocated in the NCS results in more effective Technology Education teaching and learning (Clements and Battist, 1990, Munter, 2009)

The role of the teacher defined in chapter two by the NCS, is a pivotal one, Bloch (2009, p.90), refers to the classrooms as the “first level that impacts” on educational outcomes. “This is where the teacher faces the learner in educational relationships, using his or her mastery of the subjects and curriculum, her pedagogical and methodological training and instincts, to ensure that work is covered and educational needs of the child are appropriately met”. The evidence, as stated by Bloch (2009), affirms that teachers are central to making a difference to the present. Teaching Technology Education in Grade nine is extremely challenging. Teachers need to have deep understanding of Technology Education they are to teach as well as to see how to engage their learners in that content.

The evidence of this study raises pertinent issues regarding the quality of Grade nine Technology Education instructional practices. A teacher’s deep understanding of Technology Education curriculum is significant to their ability to implement the curriculum. Shuluman (as cited in Keresting et al 2010), suggested that the kind of knowledge teachers need for effective teaching goes beyond Technology Education teachers’ learned in school. More important is “pedagogical content knowledge”, which

is knowledge unique to teaching. It is a term that describes the fundamental prerequisite for learner achievement.

To make sense of a new concept, learner needs to be able to connect it to their existing knowledge (Anthony & Walshaw, 2009). Teacher need to value the background knowledge that learners bring to the classroom and to use this knowledge to provide learners with an opportunity to build connections between what they know and what they are learning. When Technology Education learners learn meaningful to their context, they find that they can use it as a tool to solve significant problems in their everyday life, they begin to view it as interesting (Mutemeri & Mugweni, 2005; Skovsmose, 2005; Anthony & Walshaw, 2009) emphasize just how crucial the ability to make connections between Technological ideas to conceptual understanding.

The curriculum is explicit, it is the responsibility of the teacher, as the facilitator and planner of learning, to create meaningful learning experience for all the learners (Department of Education, 2002). Teachers therefore cannot assume that all learners will learn equally well from one teaching strategy or in a certain period of time. The Grade nine teachers are therefore obliged to be flexible in their teaching and innovative in developing teaching strategies.

For the Grade nine learner, manipulative or 'tools', are helpful for "communicating ideas and thinking that are otherwise difficult to describe" (Anthony & Walshaw, 2009b, p23). According to McClain (2002, p.219), "tools" are a critical resource for the teaching as a means of support to meet their Technological agenda. This support "manifests itself in

the form of instructional tasks and tools available for solving the tasks". McClain, however, advises that it is not the tool in isolation "it is how the learners use the tool and the meaning that they come to have as a result that are important" (McClain. 2202, p.219).

It is only when teachers understand their learners' ways of reasoning, can they develop instruction that supports their learners development (McClain, 2002). In chapter two, the researcher argued that the NCS highlights the need for teachers to focus on ways of developing the learner's ability to communicate technologically in their quest to become technologically literate (Department of Education, 2002a). One practical way in Grade nine is for the teacher to revoice and redescribe the explanations and solutions of the learner in a way that guides the learner to justify and explain their solutions. "Revolving involves repeating, rephrasing or expanding on student talk" (Anthony &Walshaw, 2009b, p.19).

Support the learners' ability to make sense of Technology Education by developing the skill of articulating their explanations or justifying their solutions in Grade nine, not only helps learners make links between technological language and their understanding, but they also become less preoccupied with finding solutions and more involved with the thinking that leads to the answers(Anthony &Walshaw, 2009b). Creating a Technology Education learning environment in which the social nature of the classroom facilitates conjecture and justification is therefore essential.

Technology Education communication in the form of discussions, conjectures, arguing, the use appropriate Technology Education vocabulary to reason, was the main feature in grade nine classroom. One word answers, prompted answers, chorus answers are not what is expected in Technology Education communication. Specialized Technology Education vocabulary needs to be modeled and explained so that learners make sense of the underlying meaning. In addition, learners must be encouraged to use the correct Technology Education vocabulary in discussions. More importantly, in order for Grade nine teachers to make development of reasoning and justification part of the repertoire of teaching strategies, they also need to understand the need for Technology Education reasoning.

In chapter two the researcher alluded to the significance of assessment on teaching and learning. According to the Department of Education (2003a, p.27), assessment is at the heart of and integral component of teaching and learning of Technology Education. The emphasis on tests in the observed classes confirms the need for the teachers to change the way they think about assessment. Norm-referenced assessment ignores individual differences in the learners. Assessment should be referenced to predetermined assessment standards and learners should be given multiple opportunities to demonstrate their competencies. The interviews uncovered the teachers 'lack' of understanding regarding assessment for learning as opposed to assessment of learning. It has been observed by the researcher that the participant teachers still use traditional norm referenced tests with emphasis on marks rather than gaining valuable insight into learner thinking and reasoning. "The assessment tasks should be carefully

designed to cover the content of the subject. The design of the tasks should therefore ensure that a variety of skills is assessed” (National Protocol for Assessment Grade R-12, 2011, P.3). The new Assessment Policy emphasizes the significance of the subject content as well as the Practical Assessment Tasks (PAT) that are found in Design Process regarded as the backbone for the methodology, so that the skills could be identified. It is still maintained that Technology Education should provide learners with some experience to help them with some career orientated subject choices at the end of Grade 9. (Curriculum and Assessment Policy Statement (CAPS) (2011,p.3).

A principle of OBE, according to Killein (2005), is that assessment should always have the goal of improving learning. Burns (2005) emphasizes that teachers gain ‘insight’ through regular assessment. Questioning, observing learners while they work, engaging learners in “genuine conversations” about Technology Education, means that teachers take their learners’ ideas seriously in their attempt to understand and support learner understanding. Clearly, there is a need for teachers to become conversant with OBE assessment practices as set out in the NCS and to develop a wide range of assessment strategies.

Immediate and helpful feedback is important. Focusing on the mark does not tell the learner why something is right or wrong. Self and peer evaluation is also a skill that was not observed; however, it is encouraged by the NCS as learners develop greater self-awareness. Collins (1992, p.36), declares very eloquently, that “curriculum designed on

the finest principle with the very best intentions makes no change to what goes on in classrooms if assessment procedures remain the same.”

Effective Technology Education teachers need to go beyond superficial practices implementing some aspects of the NCS in their Technology Education instruction such as practices like providing manipulatives for the learners to use, providing activities and offering opportunities for pair and group work. These are superficial changes and while necessary, they are by no means sufficient to build sophisticated Technological understanding. It is relatively easy for teachers to adopt the surface characteristics of teaching recommended by the NCS but much harder to implement the recommended core features in their everyday Technology Education instructional practice.

## **5.3 RECOMMENDATIONS**

### **5.3.1 Recommendations to Technology Education teachers for Developing Programs for Practice**

One of the purposes of this research alluded to in chapter one was a basis for offering suggestions to practicing teachers as well as to enhance the researchers' own professional development in teacher education. This study had implications for teacher education programmes in South Africa. Based on the evidence in this study, the onus rests on the Technology Education teachers and other lecturers within higher education institutions to ensure that teacher education prepares students in initial teaching for education in the democratic South Africa by developing curricular in line with the stated

competencies that articulate learning outcomes as espoused in the Norms and Standards for Educators.

In order to be able to implement the NCS the way it is intended, requires that the teachers must have a thorough understanding of the curriculum. This study has found to the contrary. Teachers cannot implement what they do not know. In addition, in order to implement the NCS the way it was intended, it requires the teacher to be skilled in pedagogy and knowledgeable in the subject matter. The NCS (2002) has identified the teacher as the “key contributor to transformation”. Bloch (2009, p890) concurs and says that “the role of the teacher is central” to making a difference.

On the basis of the findings in this research, gaps in Grade nine Technology Education teacher preparations have been revealed. There is substantial agreement that teacher knowledge of Technology Education plays a key role in quality Technology Education teaching. The critical issue is the need for a better preparation program for prospective Grade nine Technology Education teachers. The researcher proposed that areas of knowledge in Technology Education and Technology Education pedagogy be identified for prospective teachers as an outcome of their study.

The researcher recommends that the learning theory of teaching developmentally and knowledge necessary for learners to learn with understanding be a requisite for prospective Grade nine Technology Education teachers. Shuluman (in Hillrt al 2004) proposed three categories of subject-matter knowledge that are essential for quality mathematics teacher: content knowledge, curriculum knowledge and pedagogical

content knowledge. Grade nine teachers are Technology Education content specialists, i.e. Grade nine teachers have to have a specific knowledge of content and pedagogy not for all the core areas that they teach. Nevertheless, the literature, (Charalambous, 2010; Ball et al, 2008) makes it clear that it is an expectation that Grade nine Technology Education teacher need a strong, specialized knowledge base of Technology Education in order to teach effectively.

### **5.3.2 Recommendations for Practicing Teachers**

The Norms and Standards for Educators highlight the idea of being a 'lifelong learner' as one of the Seven Roles for Educators. The implication is that there is expectancy that all teachers develop a culture of ongoing learning. Teacher learning is widely acknowledged as critical to educational reforms (Collopy, 2003, p.287). Teacher competence has been called into question. Teacher competence relates to teachers having the content knowledge and the ability to use this knowledge pedagogically to ensure that the curriculum is thoroughly covered at grade level (Fleish, 2008). Sound professional development that includes a focus on understanding how children learn Technology Education, the teaching of higher order thinking, developing questioning and communicating skills will all impact on learner achievement. Studies have found that there is a strong relationship between teacher knowledge of Technology Education and learner achievement (Fleish, 2008)

An added recommendation is that teachers "take seriously the issue of their own empowerment" (Bloch, 2009). One way to do this is the formation of workgroup made

up of class teachers. This would be for teachers to focus on the areas of the curriculum that they find challenging. Taylor (2004, p219) refers to this as “collegial interaction” as a feature of schools wanting to implement and sustain extensive reform. He sees this collegiality as the “existence of high levels of collaboration among teachers, the product of teachers working together on a common project toward a common goal” (Taylor, 2004, p220). Curriculum specialists could be invited to these meetings to offer their expertise and respond to the teachers concern.

The researcher recommends that curriculum specialists make classroom visits to support and advise teachers on their Technology Education teaching.

### **5.3.3 Recommendations for Curricular Support**

The organization for Economic Cooperation and Development cited in Bloch argued that “gaps exist in all countries between policy aspirations and their full implementation. In the case of South Africa, in the context of the compressed time-span...and the fact that major educational reforms is a long-term, rather than a quick fix” Vandeyar&Killienstae (2009, p171). “It is naïve for the Department of Education to expect teachers’ perceptions to change, simply because policy mandated it”. (Vandeyar&Killien, 2007, p.111).

Training development and support from the Department of Education for the NCS have been insufficient. The poor training of teachers and the ill-preparedness for the new curriculum has resulted in a significant number of teachers who have not changed their

teaching practices. A recommendation is that teacher development needs to become a priority. It is vital, that programmes are developed to retrain Grade nine teachers in-service. Teacher in-service practices need to be aligned with curriculum reform knowledge and progressive Technology Education pedagogy so as to know how to facilitate Technology Education learning.

Schiffer&Fosnot, (cited in Collopy, 2003), add in that “Technology Education teachers are asked to enact approaches that often differ greatly from their own experiences of Technology Education instructions, and that requires a deeper knowledge of Technology Education than many teachers have” ( 2003, p.288).

Moreover, there is a need for Department of Education to develop Technology Education teacher resources, like Learner Teacher Support Material (LTSM) namely, textbooks and teachers’ guides with practical advice for teachers as to how to implement effective teaching practices. These resources must be designed to assist teachers with what and how best to teach. Coupled with the teacher resources, there needs to be accompanying learner resources that are problem based.

Collopy (2003, p.288), suggested crucial elements to effective professional development for teachers:

- First, support for teachers learning is more effective when it is linked closely to teachers’ classrooms context.

- Secondly, because learning develops in iterative cycles over extended periods, effective support is ongoing and long term.
- Third, teachers need new opportunities to build new beliefs and knowledge about teaching, learning and subject matter.

#### **5.3.4 Recommendations for future Research**

The researcher chose grade nine for the purpose of this study because issues prevalent in starting school are clearly identified in this grade as it is an exit point for General Education and Training (GET). However, a recommendation for future research is that Technology Education instructional practices be studied holistically across the senior phase in order to shed additional light on aspects of Technology Education instruction practices that appear more resistant to change.

In terms of initial teacher education, a recommendation for future research could be to investigate how teacher education might prepare teachers of Technology Education in order to increase their confidence in teaching Technology Education.

#### **5.4 LIMITATIONS**

The researcher experienced two key limitations in undertaking this study. This study was conducted during the transitional period, from the existing curriculum system to Curriculum and Assessment Policy Statement. That has made a researcher to be unable to dwell much on the forthcoming education system as the Grade nine teachers, the focus of the study, have not yet been trained as well as the system not yet been

implemented. The critical questions of the study made it impossible for the researcher to base her argument on CAPS' view on methodology as they all based on implementation of the system. Secondly, the study was a qualitative study that focused on three Grade nine Technology Education teachers, the sample was too small and therefore cannot be generalized.

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## **7. APPENDICES**

### **7.1 APPENDIX A: District Office Letter**

District office Letter granting permission to conduct research in King William's Town  
Schools

Dept. of Education

King William's Town

5600

3 August 2010

Attention: Ms Lulama Ntshaba

Dear Madam

RE: PERMISSION TO VISIT SCHOOLS FOR THE RESEARCH STUDY

I acknowledge the receipt of your letter dated 3 August 2010. In respect of the above, kindly be informed that permission is granted to visit and conduct your research studies at the schools that you have chosen.

Yours in Quality Education

---

District Director

## **7.2 APPENDIX B: Letter to schools**

Letter requesting permission to access schools

5 August 2010

Dear Principal and staff

I am a student at the University Fort Hare (East London), studying Masters in Education degree.

I am writing to request permission to conduct research in one of your Grade nine Technology Education classes at..... I would be grateful if you would grant me access to observe Technology Education lessons as well as conducting interviews to the respective teacher of that particular class.

The aim of my study is to investigate Technology Education teaching and learning practices in grade nine classrooms. Should you allow me the opportunity to use your school as a research site, data will be collected by observation, and interviews.

The school teacher and learners are assured of complete anonymity at all times. The participant teacher will be allowed to access the final report before being submitted to the institution to ensure that the details are accurately recorded and reported.

Your cooperation is highly appreciated.

Yours sincerely

---

LP NTSHABA

### 7.3 APPENDIX C: Consent Form

#### Consent Form

Ms Lulama Princess Ntshaba is hereby given consent to use a grade nine class of ..... as the research site for the thesis that she is required to write for the completion of her Master's degree.

It has come into our knowledge that the data will be collected from the classroom observations as well as interviews. The information from these will then be used in the final report. Furthermore, I have received the assurance that the school, teachers and learners will remain anonymous in the report.

Principal's signature.....

Date.....

Teacher's signature.....

Date.....

## 7.5 APPENDIX D: Observation schedule

Name of school (pseudonym):

Name of interviewee (pseudonym):

Grade observed:

Date of observation:

- Description of the lesson;
- Sitting arrangement:
- Teaching and learning practices:
- Language/s of teaching
- Learners involvement (activities)
- Resources
- Learners' response (Assessment strategies)
- Form
- Tool / instrument
- Methods / techniques
  
- Extended remedial opportunity:

## **7.6 APPENDIX E: Semi-Structured Interviews**

The interview questions were based on the classroom observations and the RNCS policy documents. These were divided into four sections namely, the teachers' views about Technology Education, The preparedness of teachers to teach Technology Education, how Technology Education teachers facilitate the learning area as well as transforming the content knowledge, as well as classroom management.

### **Section A**

**The following questions were based on Technology Education teachers' view about the learning area.**

- When you first teaching this Technology Education, what was your understanding about it?
- Has your understanding changed? Explain
- Are there any moments when you feel like you want to stop teaching Technology Education? Give reasons.
- Considering your response in 2, how would you advise a teacher having his/her first time to teach Technology Education?
- What makes you feel motivated in teaching Technology Education?

### **Section B**

#### **Questions regarding teacher preparation**

- How well do you think your training as a teacher prepared you for the classroom?
- Can you recall what the major focus of teacher preparation was when you studied to become a teacher?
- Has your teaching style changed from the time you qualified as a teacher? If it is how has it?
- How do you make your learners learn?
- What makes you feel like teaching Technology Education differently from other learning areas? Why?
- How important is your planning to your teaching?

- Do the policy documents assist you when planning?
- Are the textbooks available as well as being relevant for the learning area?
- How do you decide on the content?
- What are some of the things that you bear in mind when planning your Technology Education lessons?
- How confident do you feel to teach this learning area?
- What is your general teaching philosophy?

## **Section C**

### **Questions about classroom management**

- Do you have specific goals in teaching grade nine?
- How do you motivate your learners? Examples
- How do you feel this present class doing compared to your previous Grade nine classes?
- What was the general competency of this class at the beginning of this year?
- What techniques do you use to encourage motivating and supporting environment?
- How do the learning area meetings assist you in teaching your learners? Expatiate
- What do you think will be your learners' greatest strengths when they leave grade nine?
- How do you make them being attentive and focused in Technology Education classroom?
- How would you describe the role and participation of your learners' parents in motivating them? How interested are they in their child's education
- What makes Technology Education linked with what is being done at homes?
- What is your general practice in Technology teaching?
- In your own view how does learning occur?

- What do you understand by the term as teacher as learner?
- What do you think leads to active construction of knowledge?
- How do learners gather knowledge during the Technology Education
- How would you describe your understanding of NCS?
- What teaching philosophy do you think informs it?
- What have your experiences been like in the implementing of the NCS?
- Has anything been problematic? If so what?

## **Section D**

### **Questions specifically about a teacher teaching a learner**

- How do you assist your learners who struggle in Technology Education?
- How do you assist the above average and achieving learner?
- How does the instruction differ from the standard instruction?
- Can you explain to me how you plan your lessons for the teaching of Technology Education?
- What do you think is the most important of Technology Education instruction? Why?
- Do you teach only as a class or do you teach in small groups as well? Why?
- What makes Technology being an enjoyable learning area especially to learners?
- What percentage of your Technology Education instruction on average is whole class teaching, small group teaching?
- How are your learners grouped? Why? How often? Which activities?
- How often do you asses in this learning area?
- How do you assess your learners in Technology Education?
- Do you use the information from your assessments in any way? How?
- What is your opinion of the use of manipulatives in your grade nine class?

- What about resources in general?
- Do you connect Technology Education to other learning areas? How?
- Do you think it is necessary to do so? Why?
- What about connecting to their existing knowledge-how important is that? Why?
- How do you motivate your learners to make these connections?
- Do you use different strategies to teach Technology Education/ Give examples