Examining the challenges experienced by teachers with the implementation of the Curriculum and Assessment Policy Statement (CAPS) in Grade 10 Physical Sciences in an education district in the Eastern Cape Province

by

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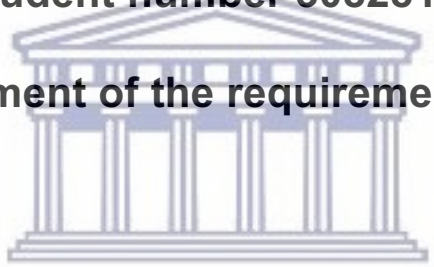
Submitted in fulfilment of the requirements for the degree



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DECLARATION

I, Nombulelo Dlova, declare that the thesis *Examining the challenges experienced by teachers with the implementation of the Curriculum and Assessment Policy Statement (CAPS) in Grade 10 Physical Sciences in an education district in the Eastern Cape Province* submitted by me is original and entirely my own work.

……

Candidate Name: Nombulelo Dlova

Date:…….

DEDICATION

This thesis is dedicated to

My husband, Richard Nongalo,

my late son, Tabile Dlova

and my daughters, Palisa and Yanelisa Dlova.

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LIST OF ABBREVIATIONS USED IN THIS STUDY

CAPS – Curriculum Assessment Policy Statement

CASS - Continuous Assessment

C2005 – Curriculum 2005

DoE – Department of Education

FET - Further Education Training

LTSM – Learner Teacher Support Material

NCS – National Curriculum Statement

NMMU – Nelson Mandela Metropolitan University

OBE – Outcomes Based Education

RNCS – Revised National Curriculum Statement

SMT – School Management Team

ABSTRACT

Recently Curriculum and Assessment Policy Statements (CAPS) were introduced in South Africa in response to confusion precipitated by previous curriculum documents. The purpose of this study is to uncover the challenges faced by teachers concerning the implementation of Grade 10 Physical science in the Curriculum and Assessment Policy Statement and consider the nature of the transformation from the previous curriculum by examining curriculum documents and CAPS. This study is underpinned by curriculum changes and critical theory. I conducted my research study in the district of Butterworth in the Eastern Cape Province of South Africa .I used qualitative and quantitative methods. The research instruments used are questionnaire and interview schedule. The research design involved fifty teachers and four school teachers for interview. The significance of this study is to ensure that all South African teachers have the necessary knowledge, values, skills and attitudes in order to understand the implementation of CAPS. The study provides a general overview on the benefit of CAPS, in Physical Science, the nature of the CAPS scheme in line with the attainment of educational assessment domains, tools and techniques used to assess educational domains, validity and reliability issues in physical science assessment, and challenges faced in the implementation process of CAPS. More specifically, an effort is made to shed some light on the challenges faced at the end of the study. Resource inputs to improve educational quality may first require some other conditions for quality education to be met, such as curriculum alignment.

Key words: CURRICULUM ASSESSMENT POLICY STATEMENT, IMPLEMENTATION, CHALLENGES, IMPROVE, QUALITY.

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CHAPTER 1

INTRODUCTION TO THE STUDY

1.1 Introduction

This chapter explains the background, context of the study, the state of science education in South Africa, the problem of the study as well as the aim and objectives of the study. The researcher also highlights the research plan, overview of chapters covered by the study including the explanation of methodology followed, measures to ensure trustworthiness and the ethical consideration.

1.2 Background

South African schools have a serious problem as far as the performance of learners in Physical Science is concerned (Kriek & Grayson, 2009). One of the numerous reasons mooted for this poor performance is the way in which the current curriculum called Curriculum and Assessment Policy Statement (CAPS) is implemented. The poor implementation strategies are caused by poor training and misconceptions about the curriculum. CAPS implementation is intended to improve the quality of education and to address poor achievement of learners. Another important aspect is the introduction of assessment standards which describe the ways in which learners should demonstrate the achievement of the learning outcomes. Christie (1999) stated that the Outcome Based Education emphasizes learning by doing, problem-solving, skills development and continuous assessment and allows greater space for educator involvement in curriculum construction.

Since the onset of democracy in 1994, the South African government has introduced a series of curricula designed to effect quality education for all South African learners. In the beginning, the post-apartheid 'New Curriculum' hinged on weak classification and framing (Bernstein, 1996) in that subjects were integrated with each other and with everyday life, with unclear pacing and sequencing (Taylor & Vinjevold,2003). Teaching was based on 'programme organizers' wherein different concepts from different subjects were to be extracted for learners to learn how to integrate everyday knowledge with school knowledge and vice versa (Taylor, Muller and Vinjevold 2003).

implement the curriculum and to enhance learners' content knowledge in the subject. CAPS expect Physical Science teachers to be knowledgeable about the teaching environment and content knowledge in order to teach a curriculum that has knowledge development and understanding as its core framing. In light of this situation, my interest as a Physical Science teacher is based on challenges during implementation of CAPS, that is, how Physical Science teachers can be supported to improve their capacity to work with teaching and learning content in the CAPS curriculum. My research study will be based on teachers' knowledge of the curriculum; more specifically the implementation challenges of CAPS experienced by Grade 10 physical science teachers. For example, in my school the matriculation results in Physical Science vary from year to year. In 2014 the pass rate was 24 % but before the implementation of CAPS the pass rate was above 55%. Based on national standards, the Eastern Cape Province is one of the underperforming provinces in Physical Science. Table 1 below shows the trend of the matriculation results for Physical Sciences over the past five years:

Table 1: Physical Sciences results 2011 - 2015

NSC Results Trend	2011	2012	2013	2014	2015
NATIONAL	53,4%	61,3%	67,4%	61,5%	56,5%
PROVINCIAL	46%	53%	64,9%	51,5%	49,5%
DISTRICT	45.8 %	53.9%	52,8%	46, 3%	46,3%
SCHOOL	52%	50%	58%	24%	71,4%

The trends in Table 1 above of the national results of Grade 12 in Physical Science reflect the performance of Grade 10 learners in Physical Science. The reason why the researcher says so is that Grade 10 Physical Science forms the basic foundation for understanding Physical Science, and it is the grade where the learner chooses Physical Science as a subject. In the opinion of the researcher, the results of Grade 12 depend upon Grade 10 performance. From 2011 to 2014 the matriculation results of physical science improved. This indicates that teachers worked very hard teaching Physical Science. The teachers implemented the National Curriculum Statement (NCS) when teaching Physical Science and examined the learners in NCS. In 2012 CAPS was first implemented in Grade 10. The assessment was done following the CAPS procedure and, as the results reflected a drop in the performance of learners in

results were changing yearly as the percentage of the pass rate in the table above indicates. The results of physical science went down at the district and school level. During the initial stage of CAPS assessment in 2014 the result dropped to 24% in my school. In 2015, the percentage rose to 71%.

Table 2: The list of underperforming schools in the Eastern Cape Province

NO	DISTRICT	0-10%	10-20%	20-30%	30-40%	40-50%	50- <60%	TOTAL
1	Butterworth	1	2	3	5	5	7	23
2	Cofimvaba			2	4	2	3	11
3	Cradock			1		1	5	7
4	Idutywa			4	8	8	4	24
5	East London		4	4	5	13	10	36
6	Fort Beaufort	3	4	3	11	7	7	35
7	Graff Reinet				2	2	2	6
8	Grahamstown		1	2	2	2	1	8
9	KWT	1	9	9	16	21	19	75
10	Lady Frere		2	1	2	2	1	8
11	Libode	2	4	4	4	5	5	24
12	Lusikisiki	1	2		3	5	6	17
13	Maluti				1	2	5	8
14	Mbizana			2	3	4	7	16
15	Mt Fletcher		1	1	2	1	3	8
16	Mt Frere		2	4	1	7	2	16
17	Mthatha		2	3	6	8	6	25
18	Ngcobo			3	1	3	2	9
19	Port Elizabeth			3	9	8	5	25
20	Queenstown		2	4	9	4	6	25
21	Qumbu		1	6	2	3	5	17
22	Sterkspruit		1		11	4	3	19
23	Uitenhage		1	6	5	2	5	19

the Eastern Cape. This indicated that there was a small improvement in the results in terms of the district position in the province. These findings reflect the background of my study.

During the implementation of the National Curriculum Statement (NCS2008) the matriculation results were promising but when CAPS was introduced there was a significant decline in the results as shown in Table 2 above. Gibson & Chase (2002) stated that the content of science and the way that links between Tables 1 and 2 show evidence of a misunderstanding of the implementation of curriculum policies using the CAPS document approach and the role of the learning process. Therefore, teachers should create a learning environment in which learners develop the desired skills and understanding as set out in the curriculum.

1.3 Context of the study

The research school is situated in a township with a growing community next to an informal settlement in the Butterworth district The area is dominated by isiXhosa speaking people who are mostly unemployed, poverty stricken and have a problem of substance abuse (Mayo, 2005; Mahy & Gupta, 2002). Mhaule (2011) whose study was based in Mpumalanga concurred that in the areas where most disadvantaged schools are located the rate of unemployment is high. The research school is surrounded by at least three unlicensed taverns even though the requirement is that the shebeens should be far from school. Taverns are still operating without being questioned by residents. Most homes in the area are headed by teenagers owing to the HIV pandemic and most learners bunk classes to search for odd jobs in the nearby Butterworth town. The rate of teenage pregnancy is very high since most learners believe that falling pregnant is a ticket to “reserves” as they will gain from the government child support grant (Chigona & Chetty, 2008; Grant & Hallman, 2006). On the first to the third day of each month learners absent themselves from school as it is the ‘pay day’.

Some teachers are drug lords on the school premises as they run their business through selling dagga muffins. The main problems faced in the area are the continuous vandalism of school property, drug abuse by both learners and some parents, poor attendance of classes by learners and the lack of cooperation from the parents and community at large. The classes are overcrowded with an average of 80 learners in

willing to work in such an unfriendly environment.

Goa (1998) explained that everyday experiences of learners and their scientific worlds are different; this requires some adjustment and reorientation as they live between home and school contexts. The researcher strongly agrees with this because the way learners perceive their surroundings directly affects their thinking and cognitive processes, and that in turn affects their performance in physical sciences. A link between the school context and home context is needed hence the researcher decided on the introduction of CAPS to arouse the interest of teachers in physical sciences and to improve their performance in physical sciences. Campbell and Lubben (2000) argued that contextualization recovers access to knowledge and thus provides equity to disadvantaged groups.

Many science teachers have developed a negative attitude towards teaching science due to a failure to understand the principles of previous curriculum policies such as the National Curriculum Statement and Nated 550 Syllabus. The school is faced with the challenge of underperformance which is caused mainly by educators who leave for better-resourced places like East London. Some of the remaining educators are not dedicated to their work and the school governing body is dysfunctional. The parents are not co-operative as that they do not become involved in the education of their children.

The school context and home context should be used in conjunction as a medium to implement curriculum policies, hence the researcher decided to uncover teacher challenges in implementing Curriculum and Assessment Policy in physical science. The CAPS document currently used in grade 10 physical science classrooms places great emphasis on the details of teaching and assessment.

1.4 State of science education in South Africa

The state of science education in South Africa is portrayed as dismal if one uses the performance of grade 12 learners (especially in the Eastern Cape Province) as the yardstick. The number of learners taking mathematics, physics and chemistry at university level is very low. The cultural background of the learners is another factor of consideration when describing the state of science education in South Africa as

communities. Chiappetta et al. (1998) stated that culturally different students cultivate meaningful science understandings when they see their culture aiding learning rather than seen as an obstruction to it.

The language of teaching and learning (LOLT) in science is English and/ or Afrikaans in most schools which disadvantages a large percentage of learners in the country because those languages are the second language of learners in Black schools. Learners experience difficulty in understanding science language because they first have to struggle with the medium of instruction before understanding and interpreting scientific meaning.

Sutherland & Dennick (2002) expanded on this by pointing out that the means of communicating the background knowledge which the learner brings into the classroom is a “background language”, which is the learner’s first or home language. Ogunniyi (1988) also explained that the language of science that the teacher uses in his/her classroom is extraneous to the learners because the background from which the teacher presents or expresses it to the learners does not take the cultural background of the learners into consideration. Furthermore, according to Odom and Kelly (1998), it is the amalgamation of a new concept into the existing cognitive structure of the learner that acts as an announcer for the new idea. The researcher strongly agrees that, as long as the problem of language of teaching and learning has not been addressed, science education will continue to suffer the challenges it experiences presently.

South Africa has a further challenge of under-skilled and under-qualified educators offering physical sciences at FET level hence the matric results (Mokgato &Mji, 2006). For example, the educators who matriculated in the NCS curriculum and proceeded to university have content gaps in some topics as they were not covered in matric. The mop-up programme is only done immediately after the introduction of a new curriculum; no continuous workshops are offered to keep educators on the same level of understanding. Alters (1997) argued that most learners and educators have difficulty in using problem-solving skills, scientific inquiry, synthesizing and analyzing, when handling scientific knowledge.

Province

One of the programmes introduced to improve science and mathematics nationally was the Dinaledi programme. The Dinaledi programme focuses on star schools

countrywide. The Dinaledi programme supports the schools that are already performing well, and there are very few in the country. This intervention came amid a deepening crisis in Mathematics and Science Education in South Africa. Mahlong (2010) pointed out that the 2009 matric pass rate in maths and physical sciences decreased, including the pass rate in the Dinaledi schools. Research has shown that South African learners' test scores in numeracy are among the worst in the world (Spaull, 2013). Pandor (2004) further explained that other interventions the Education Department had planned to improve Mathematics and Science learning included:

- Increasing the number of specialized Mathematics and Science centres such as the Dinaledi schools from 102 to 1000 in the following five years;
- identifying and nurturing talented Mathematics and Science pupils from Grade One;
- Reintroducing youth camps for mathematics and science and examining the role of the Mathematics and Science Olympiads in improving the quality of passes in mathematics and science;
- Incubation classes which are held on Saturdays and cater for brilliant learners only;
- Winter and spring schools which have overflowing classes and few educators to teach those learners.
- NMMU teacher development programme for grade 12 physical science educators.
- The University of the Western Cape programmes conducted in the Eastern Cape Province which include an ACE program (Advanced Certificate in Education in FET physical sciences), B.Ed Honours in Science Education and Masters in Science Education. These programmes seem to be successful because the grade 12 results have improved for the educators studying with UWC.

1.6 Problem Statement

The implementation of CAPS through teaching and learning plays a crucial role in the acquisition of science. The decline in matric results started with the 2014 matric class which was a pioneer group in the CAPS implementation. The 2014 matric class results reflected that there was a problem in the changing of curriculum and the problem started as early as in grade 10. The introduction of CAPS by the National Department is accompanied by problems. Teachers experienced difficulty in implementing CAPS policies and further, they were faced with a problem of lack of resources. My study is

concerned with the challenges of implementing CAPS in grade 10 faced by physical science teachers. This study probes whether teachers have a clear understanding of how to use the assessment guideline in grade 10 physical science classrooms, which places greater emphasis on the details of the plan of teaching and assessment. At the research school many teachers show various attitudes towards physical science in the implementation of CAPS; some teachers have a problem with applying the scientific skills in teaching while others are unable to assess the learners.

1.7 Research question

What challenges are faced by Grade 10 Physical science teachers in the implementation of Curriculum and Assessment Policy Statement (CAPS)?

1.8 Significance of the study

This study could help the teachers to implement the Curriculum and Assessment Policy Statement in physical science effectively. It could help the teachers to enable learners to gain an understanding of as much of the established body of scientific knowledge as is appropriate for their needs, interests and capacities. Millar (2004, p 1) emphasized that teachers should encourage learners to develop their understanding of scientific knowledge and skills that play a role in conducting practical experiments in physical science. For example, the implementation of practical work is a requirement for CAPS. This research could therefore assist in the future planning of lessons for teachers, in order to provide support and assistance to learners.

teaching science in the school curriculum includes an understanding of how scientific enquiry is conducted, of the different kinds of knowledge claims that scientists make, of the forms of reasoning that scientists use to link data and explanations, and of the role of the scientific community in checking and scrutinizing knowledge claims. CAPS also emphasizes the integration of practical work with classroom science teaching. Physical science teachers are expected to plan, carry out investigations and do projects as part of their assessment so that learners can acquire scientific knowledge for themselves in the science classroom.

This study encourages teachers to develop an inquiry- based approach that may encourage learners to be more independent and self-reliant. It will make learners aware of their environment and equip them with investigative skills.

1.9 Limitation of the study

The study was confined to a small geographical area. The researcher was also the science teacher in the school. Teachers were selected for the study and the researcher used only one District out of twenty-three Districts in the Eastern Cape Province. Consequently, she could be subjective in her views and findings.

The researcher used a limited number of grade 10 Physical Science teachers to consider the challenges that contribute to the ineffective implementation of Curriculum and Assessment Policy (CAPS). Due to time constraints, only a few participants took part in the research study. However; the researcher believes the results could still be used successfully and with validity in Butterworth and its surrounding areas. The results might, therefore, not necessarily be a true reflection of what is happening nationally.

1.10 Structure of the thesis

Chapter 1: Introduction

This chapter provides readers with a picture of the summary of the research topic and consists of an overview of the background to the study, the research question and an introduction to the study.

The relevant literature review about the research topic is presented in this chapter and ways of improving the strategy of teaching and assessment in physical sciences using CAPS document are explored.

Chapter 3: Methodology

The literature in Chapter Two forms a base for the methodology and research design in this Chapter. In pursuing the chosen research design and methodology (research approaches), the mixed method approach using qualitative and quantitative method is followed in this case study. Sampling, research instruments (questionnaires, and interview i.e. focus group interview), data collection, data analysis are presented. A

pilot study on instruments was conducted, showing how data was analyzed and how issues surrounding validity, reliability and ethics were addressed in this chapter.

Chapter 4: Research Findings

The analysis of the data collected and findings are presented in this chapter.

Chapter 5: Discussion

The analyzed data and results that were identified are discussed in this chapter.

Chapter 6 Conclusion

This chapter will bring the findings presented in Chapter 4 and Chapter 5 into dialogue with the literature and conceptual framework presented in Chapter 2. This is followed by a summary of the research findings, and reflection on methodologically substantive, scientific and exploratory aspects of the study. Finally, recommendations are made for implementation as well as recommendations for further research.

1.11 Conclusion

This chapter has provided an outline of the study and its significance. It also gives the aims and detail of subtopics, the introduction and the background of this study and pays attention to literature concerned with a clear understanding of challenges that are experienced with implementing CAPS at grade 10 Physical Science level.

CHAPTER 2

LITERATURE REVIEW

2.1Theoretical framework

2.1.1 Introduction

The theoretical framework is the structure that holds or supports the theory of a research study. Theoretical framework introduces and explains the theory which describes why the research problem is under investigation (Labaree,2013). This study is underpinned by the theories of curriculum change and critical theory, providing a review of literature and critical theory pertinent to the implementation of the Curriculum and Assessment Policy Statement (CAPS). The focus of the study is on the challenges faced by teachers in implementing CAPS in grade 10 Physical Science. This study focuses on the understanding of the individual participant's experiences regarding the challenges of the implementation of CAPS in Physical Sciences in their day-to-day working environment.

There are many challenges facing the education system in South Africa regarding curriculum policies. Physical Science teachers implement these policies the way they understand them, irrespective of whether their understanding is correct or not. CAPS curriculum encourages the learner-centred approach where learners are active role players in the classroom and the teacher provides guidance. Da Chang (2009) explained that this approach allows learners to become more probing, interactive, to be able to hypothesize, think critically and draw up conclusions, hence highlighting the process approach and promoting positive attitudes towards Physical Sciences.

In the process of implementing this approach, not only the processing of knowledge is necessary but specific outcomes area prerequisite for tagging the approach as successful. The curriculum changes have a direct bearing on the teachers as they must adapt to these changes. Curriculum reform in South Africa has undergone several variations since the 1994 democratic elections. The curriculum changed from the Nated 550 curriculum that was in operation prior to 1994, to the Outcomes-Based Education curriculum, RNCS, NCS and to the current CAPS.

The above curriculum approaches show a little promise because some experienced teachers have applied, for many years, a variety of teaching approaches that resemble a typical outcomes-based approach. This suggests that while some teachers were using copies made from books, others used textbooks as a controller and ensured that the learners were actively involved in the teaching-and-learning process. Van der Horst and McDonald (1997) differed from the DOE when discussing the traditional approach in teaching and learning Physical science. They claimed that some of the reports pertaining to traditional education are not a real reflection of what was taking place (skilling) in many South African classrooms in the past.

Van der Horst and McDonald (1997) further stated that these teachers struggled to develop in learners the skills which are required for research within the learning areas. Teachers also failed to develop critical thinkers who could demonstrate a variety of skills. Teachers' experiences were challenged when it came to constituents that are required for curriculum implementation which include training, instructional planning, curriculum, teaching and learning, assessment and time allocation of Physical Science in the curriculum.

2.2. Critical theory

Critical theory is a school of thought that stresses the reflective assessment and critique of society and culture by applying knowledge from social science and the humanities (Horkheimer, 1982). The implementation of CAPS requires both teachers and learners to relate the information taught and learnt at school to their social and physical surroundings. The critical theory therefore aligns with CAPS necessities.

Kelmer (2003) stated that critical theory signifies a way of seeing and conceptualizing, a constructing of categories, making connections, mapping and engaging in the practice of theory construction and relating theory to practice. The researcher suggests that teachers experience problematic curriculum changes due to their social and political background as per Kelmer's study. Critical pedagogy has the following two major agendas: transformation of knowledge in the form of curriculum and pedagogy in a narrow sense, that is, teaching. The researcher therefore suggests that the most significant focus of critical pedagogy is the relationship between knowledge and power. By asserting that knowledge is intrinsically interwoven with power, critical pedagogy adamantly and steadfastly dismisses the mainstream assumption of

implementation and assessment. The researcher strongly feels that when a new curriculum is implemented, government should use its power rather by asking how it can organize and deliver school knowledge most efficiently to learners in the form of training teachers. Apple (1979) captured and summarized the questions of a new curriculum in the following three shortened questions: (1) whose knowledge? (2) For whose benefit? And (3) at whose expense? Apple's questions aligned with this study because it investigates whether the knowledge implemented is using the requirements of CAPS as tabulated in the policy document. Therefore according to Apple, critical theory is a way of thinking about curriculum change in relation with policymakers, DBE, classroom teaching; the production of knowledge, school structures and available resources as well as availability of qualified educators.

Johnson & Christensen (2004) explained the theory as a discussion of how a phenomenon operates and why it operates. They further ask if it serves the purpose of making sense out of current knowledge by integrating and summarizing this knowledge, and thus it can be used to guide research by making predictions. Critical theory occurs around the curriculum changes because the word "Curriculum" consists of four core elements used for teaching and learning. The core curriculum elements for teaching and learning in Physical Science are: resources (LTSM and human resources), teaching (content), learning (transfer of knowledge to learners) and assessment (learner depth of understanding).If the assessment core has not been achieved, remedial work should be done to ensure the full implementation of CAPS in Physical Science. Figure 1 depicts the relationship between the core curriculum elements.

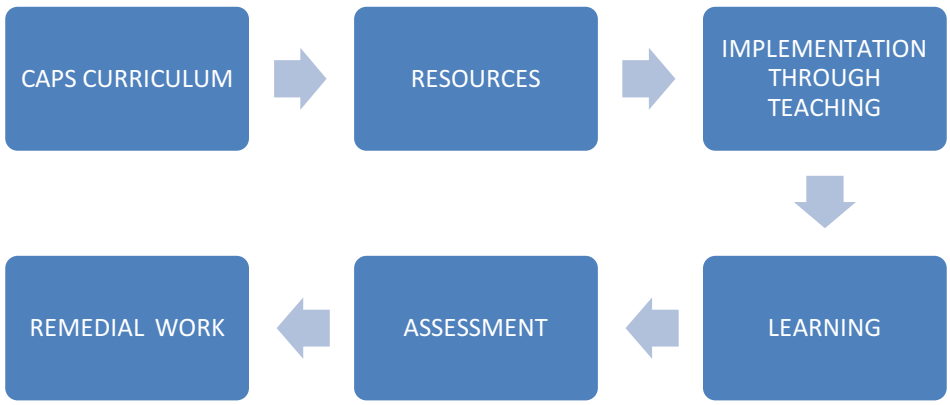


Figure 1 Core curriculum elements

resources should be an integral of curriculum development and classrooms should be well-resourced at all costs. The researcher emphasized the critical theory as motivator to emancipate the physical science teachers in terms of overcoming the challenges that they faced in their knowledge and teaching of the subject.

2.2.2 Outcomes-Based education

Mda & Mothata (2000) explained that Outcomes-Based Education (OBE) is the approach of not teaching a curriculum. They further suggested that Curriculum 2005, dubbed C2005, was introduced in 1998 and provided the shift from a content-based to an outcomes-based curriculum. The introduction of outcomes-based education brought about many challenges in the South African curriculum. The new curriculum was adopted from other countries such as Australia and the United States of America. It has always promoted Curriculum and assessment using a constructivist approach and discouraged traditional education approaches which were based on direct instruction of facts and standards methods (Lekgoatha, 2010:107). One of the purposes of this study was to address challenges and find solutions regarding the effective implementation of CAPS as they were also revealed by Lekgoatha (2010). Hoadley (2012:188) reflected that outcome-based education has negative public perceptions in South African schools as a result of the education policies changes. Researchers like Shalom (2010) indicated that the people who have challenges in the planning of curriculum policies are teachers who are the most valuable resources in an education system. This study confirms that may be there are some challenges in the implementation of this Curriculum and Assessment Policy Statement .The planning of these various policies did not include teachers previously whereas teachers are supposed to serve as catalysts in the implementation of the curriculum (Skosana,P.S and Monyai,R.B. 2013).

Chisholm (2005) confirmed that OBE was borrowed from other countries in the form of a standard-based national curriculum linked to formative and continuous, rather than summative, assessment. The implementation of Curriculum 2005 took place in an environment characterized by enormous infrastructural backlogs, resources limitations, inadequately supply of quality learning support materials, and an absence of common national standards for learning and assessment. One of the basic principles of Outcomes-Based Education is that learners should become active participants in the classroom. The learners should know how to share their ideas in a

meaningful manner. The OBE encourages teachers to move from a teacher–centred to a learner- centred approach. The Outcomes-Based Education emphasizes the importance of encouraging the learners to apply their knowledge to everyday life (Van der Horst & McDonald,2008).

The research study focused on teacher challenges in the implementation of Curriculum Assessment Policy Statement in grade 10 Physical Science. The OBE approach started to function in lower classes (grade R to 9), as natural science. OBE curriculum in South African schools has been a challenge as it was implemented after the Nated 550 syllabus. The implementation of this curriculum demotivated many teachers and the curriculum planners because initially it was necessary for curriculum developers and curriculum implementers to understand the nature of change in science.

It looks as though most curriculum changes were implemented without deeper understanding about what teaching and learning really meant and lacking specific strategies that were likely to promote curriculum changes. As a result teachers had an unclear explanation about the changes, and inadequate skills and knowledge to perform the new functions which affected the implementation process.

2.2.2 National Curriculum statement in education (NCS)

National Curriculum Statement is modelled on an Outcomes-based Education (OBE), (DoE, 2003). The version of OBE chosen encourages a learner –centred and activity -based approach for the learning environment.

The National Curriculum Statement came into being as a way of improving the quality of the Curriculum 2005 (C2005). NCS designed learning areas in terms of outcomes and assessment standards. NCS sought to ensure equal opportunity in a formerly divided system. The NCS responded to the problems experienced after C2005 (Jansen, 2009). Actually, the NCS evolved with grade 10-12 as major priory areas. NCS curriculum is implemented well where learners at particular grades have the foundation of the previous grade and are ready to progress to the next grade. NCS gives expression to the value of democracy, human rights, social justice, equity, non-racism and Ubuntu. Jansen &Taylor (2003) confirmed that the cause of the failure of implementing effectively curriculum changes in South Africa school is because of the

shortage of resources. The National Curriculum Statement creates an overload in the transition between grades and phases.

2.2.3 Revised Statement National curriculum (RNCS)

The review of Curriculum 2005 in 2000 led to the formation of the Revised National Curriculum Statement which was a streamlined version of Curriculum 2005 (Chisholm, 2005; Bantwini, 2009). South Africa has been singing a chorus of disapproval about the implementation of the Revised National Curriculum Statement (RNCS) which led the Minister of Basic Education to appoint a Ministerial Task Team that was given a mandate to investigate and make recommendations on the RNCS. The Minister of Basic Education asserted that to address barriers in teaching and learning, teachers should utilize different curriculum strategies such as those included in the Department of Basic Education guidelines for inclusive education (DBE 2010). Kader Asmal was necessary in the light of existing inequalities of under sourced schools which had large classes and many untrained teachers as learner centred education. In addition to this, the Minister argued that Physical Science should promote knowledge and skills in scientific inquiry and problem solving; and the application of technology knowledge. The Minister then went further by encouraging better understanding of nature of science, technology, the society and the environment (DBE 2010). The key principles that indicated changes in RNCS were the comprehensive outcomes and assessment standard which indicates the skills and knowledge required. The Revised National Curriculum Statement was based on the following:

- Outcomes- based education
- Clarity and accessibility
- Progression and integration
- A high level of skills and knowledge for all
- Social justice and a healthy environment, human rights and inclusivity

The principles governing the implementation of the curriculum are vital for teachers to recognize and understand for effective learning and teaching. Oliver (2009) stated those principles as guidelines that encourage purposes and objectives of the approved curriculum. It was established that some of other guiding principles accepted by the Department of Education teachers should consider when planning teaching and

learning as social justice; a healthy environment; human rights and inclusivity; elevated level of skills and knowledge; clarity and accessibility; progression; integration and assessment. These principles confused teachers with regard to how to fuse them when implementing CAPS in teaching and learning of physical science.

Themane and Mamabolo (2011) mentioned that the RNCS failed to help teachers to choose socially valued knowledge, which is the scope sequence, depth, skills and content. That means it is very important to be clear about the policy guidelines on assessment to avoid confusion with its implementation.

2.2.4 Curriculum and Assessment Policy statement (CAPS)

CAPS curriculum was introduced as an amendment of the National Curriculum Statement (NCS) and based on the same process as NCS, not as a new curriculum as interpreted by many (Pinnock, 2011). CAPS curriculum is assumed to be procedural, learner-centred where the teacher acts as a go-between or helper and plays a role of laying the base during teaching and learning. CAPS is the key tool in teaching and learning in the classroom when correctly implemented. The main purpose of introducing CAPS in SA was to improve the level of learner attainment and to bridge the gap between SA and other countries. These causes of inferior performance in the former curricula need to be understood by teachers as a stepping stone in the new curriculum. Once educators understand the shortcomings of the previous curriculum, they would be able to properly implement CAPS as an extension of NCS (previous curriculum). Teachers were not aware of the concept or term CAPS.

Sibanda (2016) indicated that there was no sufficient in-service training in CAPS hence the high failure rate in Physical Sciences. Black Africans have the highest rate of unemployment because of the low performance in Physical Science. Additionally, Mere and Kwayisi (2009) stated that to implement science teaching effectively, teachers need to have a good base knowledge of the subject as well as the application of different skills in how to pass knowledge to the learners. For instance, CAPS curriculum encourages teachers to give learners a chance to share their ideas and engage them in practical work which is a practical skill.

research paradigm as they claimed that teachers have to be knowledgeable in the content they deliver in class. Driscoll (2005) claimed that learning which involves the construction of own knowledge from own experiences produces good lesson delivery.

A teacher should teach learners having taken into consideration the various stages through which learners pass. These stages take place by means of assimilation and accommodation. This is known as cognitive development. Piaget thinks that you need to wait for a certain stage to arrive in order to acquire certain knowledge. According to Meerah, Halim, Rahman, Abdullah, Hassan and Ismail (2010), to ensure the effective implementation of curriculum, teachers need to be well trained, highly motivated, dedicated and professionally competent. Generally, teachers concentrate on finishing the syllabus without giving the learners an opportunity express their views. They push for completion of the syllabus even if the learners don't understand the content.

To explore the nature of teachers' knowledge and understanding of the curriculum, it is necessary to evaluate the training programmes they received for implementing the curriculum, which are in the form of workshops. The education system of South Africa has challenges that emanate from lack of effective teaching and learning of Physical Sciences. Mere & Kayisi (2009), stated that to ensure the effective implementation of curriculum, teachers need to be well trained, highly motivated, dedicated and professionally competent. In order to explore the nature of teachers' knowledge and understanding of the curriculum, it is necessary to evaluate the training programmes they received for implementing the curriculum, which are in the form of workshops.

Similarly, Nilson (2013) highlighted the positive outcomes of planned in-service training programmes and acknowledged that teachers in Malawi and Madagascar received appropriate curriculum training. The findings of Nilson's research showed that teaching and learning had improved in Malawi and Madagascar, implying that well-planned curriculum guidance and support had a positive influence on teachers' knowledge and experiences in teaching practices. This shows that teachers' understanding and experiences have a considerable influence on teaching practice. The literature in South Africa reveals that poorly planned workshops left teachers confused as to where, what and how to start teaching the curriculum

Table 3: Differences between CAPS and NCS adapted from the CAPS document

Role of Learner	Learner to participate as group Focus on learner taking individual member (focus on group work)	Focus on learner taking individual member (focus on group work) responsibility for learning
Approach in Learning	Discovery-based learning	Content-driven learning; no emphasis on critical thinking about knowledge validity and bias
Structure of Qualification	exit level is at Gr 12 (NSC) overview document, with exit Conceptual shift to 13 years of schooling as level at Gr 9 GETC never the new norm realised in practice	Gr R to 9 (as outlined in CAPS = Gr R to 12 GETC is not mentioned in RNCS 2002) GETC mentioned in CAPS Only
Critical Outcomes	Explicitly mentioned Also incorporated in aims and curriculum content and skills.	CAPS phrases Critical Outcome 2 as "work effectively as individuals and with others as members of a team" (specific reference to individuals
Development Outcomes	Reflect on and explore a variety of strategies to learn more effectively. Participate as responsible citizens in the life of local, national and global Communities. Be culturally and aesthetically sensitive across a range of social Contexts. Explore education and career opportunities. Develop entrepreneurial opportunities	Not mentioned
Purpose(S) Outlined as:	Equipping learners, economic background, race, gender, physical ability or intellectual ability, with the knowledge, skills and values necessary for self-fulfilment and meaningful participation in society as citizens of a free country; providing access to higher education; facilitating the transition of learners from education institutions to the workplace; and providing employers with a sufficient profile of a learner's competences	No explicit list of purposes given (but a similar irrespective of their socio- list is included in NSC SAQA document
Principles	"encouraging an active and critical participatory", learner-centred approach to learning, rather than rote and activity-based education" uncritical learning of given truths"	encouraging an active and critical "participatory, learner-centred approach to learning, rather than rote and activity-based education" uncritical learning of given truths"
Inclusivity	Mentioned in passing	Fore grounded and described in detail as one of general aims
Outcomes / Objectives Integration Principle of coherence between Not mentioned	Learning outcomes Concepts, content and skills	Learning outcomes Concepts, content and skills
Assessment Link	Assessment Standards Content / Assessment	Assessment Standards Content / Assessment
Planning	Phase plan Overview across grades	Work schedules Overview of year plan Learning programme Subject interpretation of curriculum content development for instructional designs Lesson plans

Role of Teacher and Learner	Teacher role described as: "key contributor to transformation room for interpretation of what and how to of education in South Africa"; teach "qualified, competent, dedicated and caring"; "able to fulfil the various roles outlined in the Norms and Standards for Educators: these include being mediators of learning, interpreters and designers of Learning Programmes and materials, …" etc.; "considerable room for creativity and innovation on the part of teachers in interpreting what and how to teach	No mention of the envisaged teacher Little contributor to transformation room for interpretation of what and how to teach

Constructivist teaching helps learners to internalise and reshape, or transform, new information (Brooks & Brooks, 1993). The most important implication of constructivism on teaching and learning lies in the shift from teacher-centred instruction to learner-centred instruction. CAPS approach believes that the learner is not an empty vessel. Physical Sciences learners must engage in hands-on activities and independent research in order to construct their own meaning. Constructivism is grounded in the idealistic, post-modern doctrine that the mind is constitutive of the reality that it experiences. What is important is not so much "what" learners learn, but "how" they learn (Taylor, 2002:175).

Curriculum and Assessment Policy Statement (CAPS) builds on previous curriculum; as a result it therefore still follows the requirements of the same process and procedure as the National Curriculum Statement Grades R–12 (Pinnock, 2011). There has been much debate and discussion about OBE being removed – however, OBE is a method of teaching, not a curriculum. It is the curriculum that has changed (been repackaged) and not the teaching method. In both NCS and CAPS mention is made of the curriculum conveying the knowledge, skills and values that should be communicated in a post-apartheid South Africa. They both contain a similar list of values, which includes social justice, human rights, environmental awareness and respect for people from diverse cultural, religious and ethnic backgrounds. Teachers are, however, more interested in finishing the content rather than in the development of learning.

2.3 Perception of teachers in time allocation of Physical Sciences in the curriculum

The time allocation in the CAPS document indicate that there are four hours per week allocated for time –tabling purposes at schools, with a total of forty weeks per annum per grade. It further states that the allocated time is for teaching content, concepts and skills including practical work (CAPS 2010). The content, concepts and skills are allocated forty weeks whereas formal assessment is allocated ten weeks. The amount of instructional time allocated for Physical Science is four hours a week. These are an integral part of the teaching and learning process that consists of six main knowledge areas in the subject Physical Science which are:

- Waves, Sound and Light
- Matter and Materials
- Chemical Systems
- Chemical Change
- Mechanics

It is noticeable that amongst the compulsory CAPS syllabus topics that are identified by teachers as most challenging to teach are electricity and redox reactions. The curriculum needs more work before it can be implemented and more consultation with grassroots personnel is needed. Additional time to develop text material is essential.

The Physical Science teachers work under pressure to finish the syllabus in CAPS. According to the Physical Science guideline it indicates the time frame of teaching and the topic that must be covered. When the teaching and learning process has taken place there should be a change in behaviors and humans become change agents in their environment.

Several researcher Fleisch (2008) added that in rural primary schools in the foundation phase, teachers experience numerous challenges regarding teaching and learning achievement, internationally and nationally. These studies revealed that teachers preferred to use traditional teaching methods based on a teacher-centred approach. Hullet (2004) concurred with the above researchers in that South African teachers in rural schools were struggling to use multiple teaching strategies that demand creativity in Arts and Culture, as they were not commonly exposed to them. Research in the foundation phase showed that learners were not ready to pursue more challenging activities (Jansen, 2009), and teaching and learning in rural areas was at an extremely

ineffective teaching methods and weak subject knowledge as contributing to poor teaching and learning quality. Teachers need to develop the language to teach effectively and ensure the CAPS document as guider in teaching.

Jansen (2009) concurred with them in stating that there is a need to organise knowledge for the classroom in the sense that learners are not empty vessels. Teachers should drive learners to apply existing knowledge to new knowledge of the content. This approach would tend to drive teachers to implement CAPS effectively. Teachers are teaching learners guided by the CAPS document. CAPS help teachers to shape the mind set of learners. Ngware, Abuya, Mutisya and Oketch (2010) argued that good performance depends on carefully planned tasks. Teachers need effective planning of tasks with CAPS document consultation. Teachers should ensure that the time frame is considered to pace themselves s in teaching and assessment tasks. The practical part should be included to enhance fast learning to learners with understanding.

Brown and Gordon (2009) mentioned that planning as an important guide to one's daily activities and commitment, and helps the teacher in choosing goals which involve subject area, objectives to be achieved, skills to be developed, teaching approaches, assessment, time frames and the kind of learner that teachers need to develop. The principles guiding the implementation of the curriculum are important for teachers to know and understand for effective teaching and learning. Oliver (2009) defined principles as guidelines that promote the aims and objectives of the official curriculum. Lombard (2010) added that some of the guiding principles adopted by the Department of Education that teachers have to consider when planning teaching and learning are: social justice; a healthy environment; human rights and inclusivity; high level of skills and knowledge; clarity and accessibility; progression and integration and assessment. Teachers do not seem to have enough time to plan tasks and research the content using various sources. Lombard (2010) maintained that teachers lack clarity on how these principles are manifested in teaching and learning. This research supports the views of Lombard in that the various changes that were made by the government have resulted in teachers struggling to implement CAPS in science. Lombard (2010) mentioned that the better our comprehension of teachers' experiences is, of how their practices in the classroom develop and of the factors that

evaluate theories of teacher education and professional growth that are contextualized and grounded in relevant concepts. This should inform the in-service training of teachers and instructs them in their activities.

These studies link with my research study to indicate my interest in phrases such as “teachers confused as to where, what and how to start teaching the curriculum”. Teachers are struggling to teach physical science – they have virtually no holidays and attend to classes for the sake of wanting to finish the syllabus to cover all assessment tasks in time. The Physical Science results remain languishing like the grave of “UNONGQAWUSE”. The meaning of ‘UNONGQAWUSE’ refers to the things we cannot change. Makeleni (2013) noted a slow development in implementing the curriculum in rural foundation phase classrooms. This study also noticed the slow development in implementing CAPS in Physical science classrooms and it seems there are challenges that are experienced by Physical science teachers when implementing CAPS.

2.4 Preparation required for effective curriculum implementation by teachers

Teachers need training in order to implement curriculum effectively. This research was intended to uncover the challenges that were experienced by grade 10 Physical-science teachers. By looking at the results of Grade 10-12 at district level, nationally and internationally, it is reflected that teachers experience numerous challenges regarding teaching and learner achievement (Fleisch 2008). These challenges come from lack of effective teaching and learning of Physical science in grade 10. It indicated that there is a need for full support in the implementation of CAPS by using effective training to enhance a better understanding of teachers’ knowledge and understanding of the curriculum in the classroom situation. Well planned in- service training could be noted by showing that good performance depends on the success of planned in-service training. Teachers who did not receive in-service training to empower them for curriculum implementation were forced to teach only components of the curriculum which they felt happy with. This proves that teachers’ understanding and practices have a significant influence on teaching practice. Habermas (1984) stated that genuine conceptual learning occurs only when learners make their own sense of Knowledge. Dirkx (1997) concurred with this study, encouraging teachers to employ “scaffolding” in implementing CAPS. Scaffolding is used to explain the support that aids the learner to finish tasks that would be impossible without the teacher’s support. The curricula of

schools are other people's knowledge, imposed on the learner. Not surprisingly, some learners do not bother to make personal sense of this knowledge but merely play the school game of rote learning and reproducing the curriculum knowledge.

2.5 Teacher Implementation of CAPS in Practical Work

CAPS document (2010) further states that practical work must be integrated with theory to strengthen the concepts being taught. It is also stated in the CAPS document (2010) that practical work can be in the form of practical demonstration, investigation and experiment. Practical work is one of the challenges in the implementation of CAPS.

There are three ways suggested by Lunneta and Hofstein (1982) in which learners are taught Physical Science namely: 1) theories, principles are explained prior to the engagement of practical work. 2) learners are engaged in practical work before theories, principles and concepts are explained. 3) teachers simultaneously allow learners to engage in practical work while explaining theories, principles and concepts. Teachers lack knowledge of conducting practicals in the laboratory and have inadequate understanding of teaching and learning methods in Physical science and Mathematics. Lunneta and Hofstein further stated that different activities lead to different performance of learners in the classroom. They argued that there are huge differences in learning and teaching techniques from one teacher or school to another that certainly affect learning outcomes, and these differences should be scrutinised and reported in studies involving the use of practical work. This view can further be extended beyond practical work as Lunneta and Hofstein (1982) argued that some teachers follow deductive reasoning to draw connections between data collected during practical work and the concepts and skills learnt earlier in class. This has an important implication as to how teachers approach their lessons to enhance learners' understanding of the concepts. Practical investigations should focus on the practical aspects and the process skills required for scientific inquiry and problem solving. Those teachers who have a diploma qualification obtained a long time ago need more training workshops and practical work than graduate teachers because of curriculum changes which affect teaching (Kriek & Basson, 2008).

2.6 Assessment

Assessment is the fundamental core of teaching and learning. Chisholm (2008), stated that assessment is an instrument for monitoring learner's academic progress towards a programme-preferred goal. Since the implementation of the National Curriculum Statement in South Africa, teachers have been experiencing challenges with classroom assessment. The above study revealed that teachers still have a gap in understanding how to plan formal assessment tasks according to the National Protocol on Assessment (Department of Education: 2012) which is aimed at providing a clear assessment task. It provides the structure of how assessment should be conducted to ensure effective teaching and learning. Although participants in this study had tried to cover the syllabi, the formal assessment tasks were not at the standard allied with the requirements of National Curriculum Statement and the National Protocol for Assessment (DoE: 2011). This implied that teachers were still struggling with the clarification of these documents. Evidence gleaned from this study revealed that among all the challenges experienced by grade 10 Physical Science teachers, misunderstanding as to how to implement the CAPS was a huge problem.

Teachers' experiences are explored on the components that are required for curriculum implementation and assessment. Currently, South Africa is reshaping its curriculum to meet the international standards of education to implement the NCS. Nevertheless they were still unsure of what was expected of them in terms of the curriculum changes due to lack of in-depth training and the uncertainty of planners and trainers themselves (Burger, 2010). Assessment should be both formal and informal. In both cases regular feedback should be provided to learners to enhance the learning experience. Assessment is a process that measures individual learners' fulfillment of knowledge (content, concepts and skills) in Physical Sciences by collecting, analyzing and interpreting data and information obtained from this process to:

- Enable the teacher to make reliable judgments about a learner's progress
- Inform learners about their strengths, weaknesses and progress
- Assist teachers, parents and other stakeholders in making decisions about the learning process and the learners' progress. (DBE, 2011).

Assessment is a mutual process involving teacher and learner in a dialogue to establish current levels of performance and to negotiate ways in which the level of

of the learning process monitored and the planning of teaching reviewed. (Reference?)

The purpose of assessment is to grade, select or evaluate. In the empirical study upon which this paper is based, classroom assessment was based on testing in which learners were expected to produce the correct answers. In constructivist assessment, however, the process of building and assessing knowledge is viewed as more than a product, it is a process of creating and illustrating own understanding. Mediation and

acknowledgment of the learner as an individual are essential. Constructivist views of assessment emphasized the concept of continuous, dynamic assessment. The interactive nature of teaching and learning is extended to the process of assessment. Assessment activities should be designed such that learners are assessed on their use of scientific inquiry skills, planning, observing and gathering information, comprehending, synthesizing, generalizing, hypothesizing and communicating results and conclusions (DBE, 2011).

CAPS uses Continuous Assessment (CASS), meaning that learners are assessed from informal tasks to formal tasks and examinations. Assessment becomes 'an organic part of teaching and learning'. Connections between assessment and learning encourage a holistic approach to assessment and its impact on the teaching-learning process. Teachers should follow the assessment requirements as explained in the CAPS document every time. In a constructivist framework, the role of the teacher in the teaching-learning and assessment process is to monitor knowledge construction. This role of the teacher involves assessment of previous information, acquisition of additional information and transformation, elaboration and organization of newly acquired information. Whenever the teacher assesses the learner, the teacher should ensure that the planning deals with content and has aims. They help to give direction in the planning of teaching. Planning designers should be flexible with regard to any changes that would suit the learner environment.

2.7 Competency of educators

A necessary condition is good subject knowledge which provides a base level of confidence essential for providing high quality feedback and scaffolding (Hattie & Tampered, 2007). If educators have a thorough grounding of CAPS and its

would be minimized. Continuing professional teacher development is an essential component of a high quality comprehensive teacher education system, as envisaged in the Minister of Education's *National Policy Framework for Teacher Education and Development* (Department of Education2008). A continuing professional teacher development system has six main purposes:

- To improve schooling and the quality of learner achievements
- To coordinate professional development activities with a view to achieving sharper focus and effectiveness
- To revitalize the teaching profession and foster commitment to the profession's seminal role in the development of the country
- To contribute to the responsible autonomy and confidence of the teaching profession
- To enable the profession to re-establish its professional standing and role in advancing the ideals of social justice
- To acknowledge the effective participation of teachers in professional development. This is a priority for the education system and the teaching profession. For the appropriate implementation of CAPS teachers need to be trained and to study further to bridge the content gap as cited by DBE.

This system is supervised and administered by the *South African Council for Educators* (SACE) and supported by the DBE. It consists of professional development activities, endorsed by SACE, for which educators earn professional development points. Teachers are expected to earn a target of 150 points in each successive rolling three-year cycle (Department of Education 2008). The SACE task team has already identified risks and problems regarding the implementation of the new continuing professional teacher development system (Department of Education 2008). A few of these problems are as follows:

1. Funding to the system may not be sustained.
2. ·The new professional development policy may not be communicated clearly or effectively to teachers in schools. An aggravating factor is that teachers' morale is low in general.
3. Backlogs in school infrastructure, resources and administrative support, and teachers' workloads, may be inhibiting professional teacher development.

capacity to support teachers' developmental needs. The Provincial Departments of Education may not have the capacity to support the system.

The educators need to be competent in all CAPS related respects before implementing the curriculum.

2.8 Using language skills in teaching and learning environment

Teachers of Physical Sciences should be aware that they are also engaged in teaching language across the curriculum. This is particularly important for learners for whom the Language of Learning and Teaching (LoLT) is not their home language. It is important to provide learners with opportunities to develop and improve their language skills in the context of learning Physical Sciences. It will therefore be critical to afford learners opportunities to read scientific texts, to write reports, paragraphs and short essays as part of the assessment, especially (but not only) in the informal assessments for learning. Kress (2008) highlighted the importance of teachers' experience in curriculum practice. This is referred to teaching and learning of the subject content, language of instruction and the resources in the classroom environment. Teachers should teach Physical science in English because it is not examinable in ISIXHOSA and that should encourage teachers to consider the language of teaching and learning (LoLT). Teachers are confused sometimes as to how to share their knowledge with learners because of other policy documents (i.e. Constitution of South Africa, 1996) which gave an instruction of using mother tongue and code switching when teaching. Kress (2008) further cited that teachers teach less because of the confusion of the various policies.

On the other hand Meerah, Halim, Rahman, Abadullah, Hassan and Isamil (2010) explored teachers' experiences in teaching marginalized children in Malayala and provided evidence that teachers in schools serving socially disadvantaged rural learners reported lower levels of pupil motivation more especially in rural schools where learners are struggling to express their views in the period of assessment.Taylor and Taylor (2013) emphasised the challenges that occur in school management, socio- economic factors and other non –academic areas of concern that were widely reported the media..

Fleisch, (2008) and Pinar (2010) highlighted that South African learners from a disadvantaged background do not have access to the hierarchical level necessary to perform activities demanding higher order thinking. The language of learners and teachers in the rural areas is not the same as learners and teachers in urban areas. Teachers explain the content in isiXhosa and guide the learners to memorize the question papers. Makeleni (2013) confirmed in their study that 60% of teachers in Malaysia were dissatisfied with the use of English as the medium of instruction. Teachers experience challenges with regard to the language of teaching and learning. The views of Kalpana (2014) concurred with this study because it emphasizes an importance of pedagogical knowledge as the knowledge that helps teachers in understanding of how to engage learners in lesson and how to apply cognitive, social and developmental theories of learning in the classroom.

2.9The necessity of learning teaching and support material (LTSM) in Science

The resource challenges in the system would be addressed, especially regarding the provision of at least one textbook per child per subject monitoring. The Department of Education (2010) launched the Literacy and Numeracy programme together with the Mathematics, science and Technology Strategy, under the overarching National Strategy for learner Attainment (NLSA). The aim of developing these strategies was to correct the mistake of subject choices and improve subject and curriculum support. Challenges identified were school-base assessment, post–provisioning, utilization of resources and the development of management in schools. Many schools in South Africa experience a problem of infrastructure and resources. Silverstein (2002) referred to the availability of resources when comparing quality in different schools with level of affluence in the area in which a school is situated.

The importance of understanding the influence of lack of facilities and resources in schools always arises where there is serious underperformance in schools. There is an important argument by Miller (2006), who stated that if more time is spent helping learners to make sense of the theories with what they already know, this builds learners' good performance. Failure to use various approaches in teaching science leads to discourage teachers to contribute to and relate with levels of information required to on proceed with and improve the implementation of CAPS and the academic performance of learners (Gibson & Chase, 2002). Sugar & Barnett (1994)

major contributing factor to poor results in science due to poor CAPS implementation.

Many Physical Science teachers have a problem with CAPS in South African schools because of the gap in content knowledge and lack of pedagogical skills to successfully implement CAPS. A study by Taylor (2003) and Gustafson and Paste (2008) found that insufficient teaching time is a key factor behind under-performance. Teachers were going the extra mile by teaching during the holidays, conducting Saturday classes and specialist classes after school, but no change in results has been witnessed. Shepherd (2011) found that extra classes offered by teachers outside the normal school day are associated with better learner improvement which was contrary with CAPS implementation. Another key factor was that sometimes through teacher absenteeism, the syllabus was not completed within the required time. Reddy (2010) found that around 11% of teaching time was lost due to absenteeism and personal reasons.

Pinnock (2011) emphasised use of text books and workbooks by teachers and learners at schools. Teachers should implement more careful oversight to the promotion and development of reading across the schooling system, to strengthen literacy and numeracy skills generally, and Mathematics, Science and Technology skills specifically. Improvement in attendance and accountability for appropriate use of time in school by teachers and other officials at school and district level, particularly in the classrooms, should be considered in CAPS textbooks, with textbook teaching, and learning resources work well and save instructional time. Teachers also need training in the use of textbooks as well as training of the content gap. In South African rural schools, there is still a lack of textbook supply. As a result, the Minister of Basic Education in South Africa initiated a programme of workbooks from Grades 1 to 6. This was meant to assist teachers to improve learner performance in Numeracy and Literacy in their classrooms. Almost all the teachers have limited resources at schools and do not know how to use them because of lack of training.

2.10 Contribution of parents

Parents must assist the school and educators with learner's informal assessment such as homework. The challenge is limited parental and external support, and the introduction of NCS and CAPS, which is full of technical jargon, has been problematic

due to inadequate training .The simplicity and precision makes it easy for new and inexperienced teachers to follow. There is good content which allows teachers to be creative and also gives leeway for teachers to apply their own ideas. All outcomes make it easier for teachers to work towards such outcomes. There is sufficient emphasis on physical movement in the curriculum which is good. The CAPS curriculum also attempts to involve the contribution of parents to assist their learners in education but sometimes parents do not care about their children's education. Another aspect which needs to be taken into consideration by parents is teenage pregnancy where teachers have no say about the learner's. This results the low performance in learners because teachers continue to finish the syllabus by the time learner takes the maternity leave. The transformation of economy depends on access to quality education (Diseko, 2014). According to Diseko's views, once teachers fail to implement CAPS appropriately, the learners would surely fail to proceed to the next grade. The learners would drop out of school and seek jobs and there would be no future scientists to develop our country. Teachers should have an opportunity to engage learners with the content that involves the community. For example, if we give water purification as a project, the learners would apply the indigenous knowledge system and share their ideas with their colleagues. By doing so, one promotes the socialization process within teaching and learning. Indigenous knowledge system (IKS) can be used to address challenges facing society.

2.11 Conclusion

In this chapter, the research examined the issues surrounding curriculum change and their challenges on implementation of CAPS in grade 10 Physical Science by teachers. The chapter started by discussing the historical background of curriculum change in South Africa, from the Bantu Education era, and the education system after 1994 until to date. The literature review mainly focused on the teacher challenges with the implementation of CAPS in Physical Science. It looked at the theories and methods of predominant teaching and learning of Physical Science and why it is important to understand the theory behind it. Curriculum change in Physical Science also highlighted the importance of understanding the nature of changes in Physical Science curriculum. The literature has also revealed how these challenges affect learning and teaching in Physical Science. This study highlighted the basic training teachers received, lack of curriculum understanding, inadequate resources, poor infrastructure and overpopulation in classrooms.

CHAPTER 3

METHODOLOGY

3.1 Introduction

In the previous chapter the researcher gave a comprehensive and critical review of pertinent literature pertaining to the problem statement. In this chapter the researcher describes and illustrates the role of the qualitative research method to be used. The quality of this research depends on the research questions. The researcher will discuss and justify the following: research approach, population, sample design, data collection, data analysis, instruments, validity, reliability, ethics and the conclusion. The aim of this study was to investigate teacher challenges associated with the implementation of the curriculum and assessment policy statement in Physical Sciences.

3.2 Research approach

Chokwe (2011) indicated that embracing a qualitative research methodology, aims for a better understanding of human experience. The researcher used qualitative and quantitative methods. The reason for using both approaches is that one builds upon what one knows and offers a greater chance to obtain related information as a researcher. Seale (2012) indicated that the qualitative approach attracts researchers who want to explore voices and experiences which they believe have been ignored and misrepresented. The researcher looked at the perceived teacher challenges associated with the implementation of the Curriculum and Assessment Policy Statement in Grade10 Physical Science. The main objective of using this approach was to collect more data from the participants using various tools. Silverman (2006, 2011) and Kerachsky (2008) defined the qualitative method as a method that deals with a narrative and inductive approach which focuses on uncovering meaning from participants. The researcher recognised that the case study would be the most appropriated approach for the topic and the purpose of the study. A research paradigm is a perspective held by a community of researchers that is based on a set of shared assumptions, concepts, values and practices. A qualitative approach employs ground theory for generating and developing a theory from data that the researcher collects.

a multi-method involving an interpretive naturalistic approach to its subject matter. The researcher collected the data and used it in data analysis. Qualitative research involves data that are recorded in narrative descriptions, not numbers. Researchers use qualitative methods to observe and describe conditions rather than control them. Johnson& Christensen (2008) and Turner (2003) stated that more valid data and reliable data were achieved through this research method as the tools used complemented each other. The information that was not protected in one tool was shielded by another instrument which caused it to become reliable data.

3.3. Research design

A research design is a blueprint for conducting a study that increases the probability that study findings are a true reflection of a reality (Burn &Grove, 2003:195). In the light of this view, the researcher designed this study so that there was no problem collecting the data because the researcher combined the different components in a consistent and logical way. Yin (2003,2011) agreed that the research design is the straight sequence that intertwines with empirical data at the beginning of the research study. The research design helps to prevent a situation where evidence does not answer the research question. The researcher gave the framework of how to conduct the research using a questionnaire and interview schedule as instruments.

The researcher used phenomenological design to collect and analyse the data. Phenomenology is a science where the purpose of which is to describe particular phenomena, the appearance of things, as lived experiences (Streubert &Carpenter (2002:56). It is for this reason that the researcher used the observation instrument. Holloway (2005:47) and Sreubet and Carpenter (2002) concurred that phenomenology deals with description, appearance and people who have an experience about the event.

The researcher defined a research design as a plan or strategy of how to conduct research in full detail and to follow a sequential form. Brooms and Grove (2003:195) stated that this design is a blueprint for conducting a study that increases the probability that the study findings are a true reflection of reality. Dabbie (2007) and Creswell(2009) emphasized that it is necessary for researchers to use trustworthy research methods in order to gather data that are effective and technically sound.

3.4.1 Site selection and sampling

A sample is the collection of people who have been selected for a given research study (Creswell, 2009). The researcher used all 50 Grade 10 Physical Science teachers in (see Table 4) the cluster in stage one for the open-ended questionnaire. The participants were the purposively selected to distinguish between rural (30) and urban (20). Four teachers who responded in the questionnaire were then randomly selected, two from the urban group and 2 from the rural group. This was done to provide better spread between rural and urban for interview purposes. Due to the distances between schools and the time available to interview only four teachers were selected.

Table 4: Selection of participants

Data Collection	Sample	Selection criteria
Questionnaire	50 teachers	All from one district
Interviews	4 teachers	Purposive: 2 urban and 2 rural 2 randomly selected from 30 rural schools 2 randomly selected from 20 urban schools

Dauson (2007) and Thomas (2003) confirmed that a sample from a large population should be controllable while on the other hand the large sample gives more trust and input. Furthermore, Gay (1992) stressed that it is necessary to select a sample because the responses recognise the reason of the sample determine the generalisation of the results.

The researcher coded those four respondents as school teachers, using letters A to D for the interview. The aim of stage 2 was to get a clear understanding of CAPS. The researcher chose the random sampling method. It enabled the researcher to randomly pick the sample. For the research, it is a less costly type of sampling and is assured of high participation rate (Macmillan & Schumacher 2001). Random sampling ensures unbiased representation of a group and gives each participant an equal and independent chance of being selected (Bless & Higson-Smith 2000). Random sampling was used in the study because it gave the researcher the opportunity to gather reliable information from honest participants who were not chosen in terms of a certain purpose.

consisted of four Grade 10 Physical Science teachers from four different schools, two from rural schools and two from urban schools (from a population of 50 educators from different urban and rural schools). De Vos, Strydom, Fouche`& Delport (2011) postulated that a population is an entire set from which the entities or components of study are selected. The researcher used the random sampling technique to select those schools which are close to the researcher's school, approximately 10km away. The schools from which educators were sampled had high numbers of learners studying Physical Science compared to other schools in the area. The results in Physical Science in the Butterworth district are badly affected by the results of the schools mentioned above due to their high enrolment.

3.5 Case study

This research is a case study at four schools. According to Tashakkori & Teddie (2003) case study research is a form of qualitative research that is focused on providing a detailed account of one or more cases such as the Physical science classes of the participating teachers. In this research the case study approach was used during the interview stage as 4 schools were selected as its cases for study.

The particular schools were used to, as Yin (1994) explains:

1. To explain complex causal links in real-life interventions ie to consider the four teachers experiences in their Physical Science classroom, each as a case on its own.
2. To describe the real-life context in which the intervention has occurred ie the real-life context is in each of the four teachers' Physical Science classes
3. To describe the intervention itself – to describe how the four teachers experience the Grade 10 Physical Sciences curriculum during its implementation
4. To explore those situations in which the intervention being evaluated has no clear set of outcomes ie how the Grade 10 Physical Sciences leads to its unique outcomes in each of the four schools used as case studies.

Similarly, a case study is more aptly described as a strategy than a method. It sets out to address the understanding of a phenomenon within its functioning context

Intrinsic - when the researcher has an interest in the case; *Instrumental* - when the case is used to understand more than what is clear to the observer; *Collective* - when a group of cases is studied. Explanatory case studies may be used for conducting fundamental investigations.

3.5.1 Advantages of a case study

According to Yin (1994) case studies tend to be selective, focusing on one or two issues that are fundamental to understanding the system being examined. These studies can be holistic or embedded, the latter occurring when the same case study involves more than one unit of analysis. Multiple-case studies such as in this research follow replication logic. This is not to be confused with sampling logic, where a selection is made out of population, for inclusion in the study. This case study revealed the impact of teacher challenges with the implementation of CAPS in Grade 10 Physical Science. By reviewing the background of the research study regarding science education internationally and nationally, it contributes to the various existing studies.

3.6 Research instruments

3.6.1. Questionnaire

One of the most compelling reasons for choosing a questionnaire for this study is the advantage that it has regarding the possibility of obtaining information about a large population in a sample The researcher used this type of instrument to obtain more information about the feeling, perceptions and challenges of implementation of CAPS in Physical Sciences. (Johnson & Christensen, 2000). The questionnaire was open-ended to allow participants to answer the questions set to them in depth. It is very important to emphasize that the content of the questions must be relevant to the response sought from the answer (Sobrepena, 2012; Bryman, 2008).

3.6.1.1 Advantages and disadvantages of a questionnaire

Creswell (1994) mentions the following advantages of a Questionnaire:

- Indicates the extensiveness of attitudes held by people

- Has precision, is definitive and standardized
- Can answer such questions as "How many?" and "How often?"
- Measures level of occurrence, actions and trends

Creswell (1994) mentioned the disadvantages of questionnaire
If sent by post, the response degree is low. It often entails follow up efforts.

- May take a lengthy time to accept enough answers
- Respondents' character-choice (latent unfairness)
- If used for material pretest, exposure to materials is not controlled
- May not be appropriate if audience has limited text talents.

3.7 Interview

The interview is a common method used in qualitative research. According to Marshall (1997:65) the researcher collects data, the data need to be summarised and interpreted. The interview guide or schedule is used as a strategy to provide the researcher with a set of predetermined questions that engage the participant and designate the narrative terrain (Krueger & Casey, 2009).The interview questions for this study confirm the views of Gill (2008) who stated that the most common source of data collection used in qualitative research is the interview because the participants provide different forms of information. The interview schedule in this study consisted of open-ended questions and questions were rephrased where applicable to suit the interviewee's understanding. Welman (2001) described an interview guide as a list of topics and aspects of these topics that have a bearing on the given theme and which the interviewer should raise during the course of the interview. Welman further explained that, although all respondents are asked the same questions, the interviewer may adapt the formulation of the questions. According to the Bryman (2000) the qualitative data researchers generally utilize the process of inductive coding, which can be easily influenced by the researcher's subjectivity.

Baker and Taylor (1995) highlighted that several researchers suggested that the personal construction of meaning in science is related to the language background of the learner, and to the compatibility of the learner's language with that of science education. The participants in an interview have a higher response rate than in a questionnaire because participants become more active and motivated (Oppenheim, 1992:81-82). There are three types of interviews which are different from each other.

reason was to allow the participants to answer the questions freely. The interview schedule is attached (See Appendix 1and 2).

3.8 Pilot study

A pilot study is conducted to verify the validity of the instruments, i.e. the interview schedule and the questionnaire which were used in this research study (Johnson, Gay 2010). Johnson and Gay defined the pilot study as a preliminary test of research instruments for reliability and validity for the study. The questionnaire was piloted to find out whether the research elicited the respondents. The researcher used the same or similar questions in the two stages by linking the views of Holloway and Jefferson (2007:8) who stated, "the assumption in the questionnaires and interviews if the words are the same the researcher should be consulted. The researcher used non-participants to select the four respondents. The aims of the pilot study were:

- To test the suitability of the questions that were to be asked in the interview.
- To find out whether the questions were clear for the interviewee to understand.
- To ensure that the questions were objective and would not cause any embarrassment to the respondents
- To test whether the questions were structured in a way that the outcomes of the research that was stated in Chapter one would be attained.

The researcher piloted the study to check and analyse the responses of participants before giving the instruments to the actual participants. In order to gain a greater sense of confidence and maximum benefit from using the questionnaire, it was crucial that the instrument was piloted. According to Bryman (2008) it is always desirable to conduct a pilot study before administering a self–completion questionnaire. In this study the researcher chose one teacher who did not teach science and interviewed him using the same questions with the aim of checking for ambiguous questions, before the interview was conducted. The supervisor checked the appropriateness of the items in the questionnaire before it was used. The pilot assessment tool was used as a pinpointing tool which aided the researcher to report on the length, mistakes and

3.9 Data collection

Methodology is the methods that one *uses* to conduct a research. The aim of research methodology was also to describe and analyse the research design (Biggam, 2011). It also helps to collect relevant data, which are important for the research title and suit the research question. The researcher decided to use two instruments, an open-ended questionnaire and an interview schedule,for the participants who took part in the research study. It is important to note that no single instrument is better than the other and it is not easy to collect credible data (O'Leary, 2004).

3.9.1 How data was collected from participants using the Questionnaire and Interview schedule

The researcher clarified the strategies of data collection by explaining the interview schedule in detail. During the first day we prepared the venues for conducting the study and light refreshments were provided. The reason for this preparation is that the research study was conducted after school hours. Interviews are conducted for a specific purpose, and are not an ordinary daily exercise (Dyer, 1995). A convenient venue was arranged for the interviews with the teachers. A semi-structured interview was prepared for learners and teachers because the questions were flexible for understanding. Probing was done where necessary. The data collected from participants was qualitative data because the responses were genuine. Data collected provided meaning about what the participants felt and believed. The interviews took about one and half hours.

Step 1:

A questionnaire was used in the first stage. All 50 teachers were given an open-ended questionnaire and the aim of conducting the research study was explained to them before they engaged in the questionnaire process. A sound atmosphere was created so that participants could feel free to express their views about CAPS and its implementation. According to Johnson & Gray(2010), a questionnaire is an identity report data-gathering tool that each research participant seals out as part of the research study. The data were bagged on an excel spread sheet. As suggested by Marton (2005) and Stemler (2004), the data were analyzed and signified visually in

Step 2:

The researcher used four respondents from 50 respondents and coded as school A–D. Saldana (2009) defined a code as a word or short phrase that symbolically assigns a summative, salient, essence-capturing name for a portion of language –based or visual data. Textual analysis critique and CAPS analysis were conducted to find the gist of what participants meant when responding to interview questions. Textual analysis is a style of communication that is utilized by researchers to clarify elements of documented messages either recorded or visual (Frey 1999). He explains that textual analysis is a tool that explains elements of a message such as its content, structure and function. In using textual analysis researchers have to ensure that they select the relevant text to be studied, deciding on the appropriate approach to use in the analysis of the text. In this study, textual analysis of CAPS Implementation in physical science is examined and scrutinized. After the textual analysis process, the researcher again gave the participants the interview schedule which consisted of ten questions to record uncomfortable answers or missing responses. According to Fontana and Frey (2000), a rigorous atmosphere should be made for the respondents to sense control during the interview therefore questions were posed in a peaceful manner and re-articulated and interpreted where it was necessary.

3.9.2 Data collection plan

The Data collection plan shows the summary of the following methodological framework in table 3 below and an outline thereof. These data are typically

analyzed quantitatively. Questionnaires are attached as Appendices 1 and 2.After some of the research data were collected, simple computations were applied to determine how many responses were needed to ensure reliability (Merriam, 2009).This process is explained in the four steps below and the outline of the data collection plan.

RESEARCH DESIGN STEPS	INSTRUMENT	RESPONDENTS	ANALYSIS
Step 1: I What were teacher perceptions in the Butterworth education district of the implementation of CAPS in Grade 10 Physical science?	Questionnaire	50 Grade 10 physical Science teachers	Excel, transcription, , graphs, tables
Step 2 How did four selected teachers experience the implementation of CAPS in Grade 10 Physical Science?	Interview schedule	Four school teachers out of 50 teachers	Textual analysis critique, Caps analysis

3.10 Data analysis

According to Marshall (1997:65), once the data has been collected and summarized, the researcher needs to make sense of the data by beginning the process of analyzing the data. With qualitative data, researchers generally utilize a process of inductive coding, which can be easily influenced by the researcher's subjectivities (Bryman, 2008). The interviews were audio taped, transcribed and translated where necessary. De Vos (2011) confirms that using the recording while collecting data is a good approach for interpretation and analysis. The data was cleaned, i.e. removing the information that is not relevant. The interview was conducted in English, but other participants were free to use Xhosa which was then transcribed and translated to English. Any data that were not relevant to the study was erased. The important data

participants.

3.11 Reliability

Reliability is concerned with the measuring tools that researchers use in research studies, and whether they are *consistent.* Reliability is a pre-requisite of validity, but does not guarantee it. It is the best way to review reliability or the extent to which the test measures the result of properties of those individuals being measured (Rudner &Schafer, 2001). Reliability is the degree to which an instrument produces stable and consistent results. The reliability and validity of a piece of research indicate its *trustworthiness,* in other words, the extent to which study findings reflect the world that we are seeking to explore in our observation. While the relevance of the *trustworthiness* of a piece of research still stands, Gibson and Chase (2002) suggested that we can ask four key questions when designing or appraising qualitative research such as ethnography, and suggest terms to describe these issues. Reliability is concerned with the measuring tools we use in research, and whether they are *consistent.* Reliability is a pre-requisite of validity, but does not guarantee it. While the relevance of the *trustworthiness* of a piece of research still stands (Gibson & Chase, 2002), to ensure that the data was reliable, the instruments underwent piloting by being tested on non-participants and the results indicated that the study was feasible.

3.12 Validity

Validity refers to how well a test measures what it is supposed to measure. When researchers measure behaviours, they are concerned with whether they are measuring what they intended to measure. MacMillan (2009) explained that the internal validity refers to the extent to which the findings accurately describe reality. Validity is an indicator of the *accuracy* of research, whether a study gives a true picture of what it is exploring. Internal validity refers to the extent to which the findings accurately describe reality. The research used the tools and techniques for gathering and analysing data to establish the validity and reliability of the study. External validity refers to the ability to generalize findings across different settings (Creswell, 2009). Creswell (2009) noted, "Since there can be no validity without reliability (and thus no integrity without steadiness), a demonstration of the former is sufficient to establish the latter". The objectives of this research were aligned with the research questions. The researcher made sure that the instruments (interview schedule and questionnaire)

3.13 Ethical consideration

In this research study, the researcher ensured that the rights and welfare of the participants were protected (Baez, 2002; Nagy, 2005). The researcher gave respondents a guarantee of confidentiality. The researcher conducted the research according to the professional and ethical guidelines of the university. According to the views of Rule and John (2011:111), the key features of the quality of research are the ethical relationships and its exercise before and during this research study. The researcher provided further clarity between the researcher and participants. The researcher tried to conduct the research in an ethical and sound manner that enhanced the quality and trustworthiness of the research. The researcher also explained the aims, objectives and the use of the data. Firstly, the researcher requested the necessary permission from the University of the Western Cape Ethics Committee as well as in the District in the Eastern Cape Education Department.

Considered and complied ethical measures in the course of conducting the research of this sensitive topic were applied to avoid the argument (Behrman, 2004 and Field & Gross, 2005). The researcher provided a guarantee that no respondents would be injured in any way during the research. The research was conducted in such a way that no bias was experienced and it was free from arrogance and pre-conception. In order to ensure the safety and rights of the participants, the researcher was informed about the prevailing ethical considerations, such as informed consent, permission from the Education Department, rights of the participants. voluntary participation, anonymity and confidentiality (Berg, 1995). The researcher was given informed consent from each participant. The informed consent was an on-going process (Flick, 2009). Issued letters to the participants appear as an appendix, requesting permission and an acceptance letter to conduct the research. Before switching on the tape recorder during interviews, the researcher asked the participant if it was acceptable to use it.

To avoid disturbance during interviews, which would lead to respondent discomfort in answering some questions, noticeable by their body language (change of facial expression), respondents were reminded of their rights that they were not obliged to

the participants' right to note any unforeseen findings from the research that they may, or may not, have wanted to have known. The ethical principle refers to the obligation

on our part as the researchers to respect each participant as a person capable of making an informed decision regarding participation in the research study. The researcher ensured that the participants had received full disclosure of the nature of the study, benefits and alternatives, with an extended opportunity to ask questions. (See Appendix 1-4).

3.14 Conclusion

This chapter has delivered all the details of the research method starting from the research strategy, data collection technique, their advantages and disadvantages, and detailed process of data analysis processes that were employed. Minimization of limitations, ethical considerations and explanation was provided of the research design and methodology used in the study, as well as the purpose for the selection of research methods, approaches and instruments employed. The following chapter will present the findings and provide an analysis of the case study results.

CHAPTER 4

RESULTS

4.1 Introduction

The previous chapter outlined the methodology employed to collect the data. The purpose of this chapter is to present the data that were collected using the instruments described in chapter three, aimed at answering the research questions. In order to present the data in an organized manner the researcher provided themes or categories from the data collected from teachers about the challenges encountered in the implementation of CAPS in grade 10 Physical Science and are in the form of tables, graphs and discussions. Themes, metaphors and patterns extracted were rank-ordered starting with the most frequently appearing theme. Discussions on each theme or metaphor extracted from the open- ended responses of teachers are provided in this chapter.

4.2 Data analysis

In step 1, all the teachers (50) in Senior Secondary Schools in the Butterworth District answered the questionnaire. Thereafter, the researcher selected four respondents randomly from 50 respondents. The four respondents were categorized as school teacher A, to D. These respondents gave their full support in these interviews and showed a positive attitude during these sessions. The responses of teachers are presented in tables.

The themes that emerge from the analysis of the responses of the teachers regarding the challenges that are experienced by teachers with the implementation of CAPS in grade 10 Physical Science were presented as narrations. Extracted patterns and themes in the data were organized through the use of the items in the unstructured interview schedule. Thus, categories for organization of themes and patterns were predetermined (MacMillan & Schumacher, 1993). Both in the extraction and presentation of themes, the researcher used emic categories. The researcher used two instruments, one of each item in open-ended questionnaire and the interview schedule were those of the respondents or the interviewees (4 teachers).

4.3 Teacher perception

All the teachers (50) indicated that they had challenges with the implementation of CAPS in Physical Science. These challenges are discussed below as highlighted in the questionnaire.

Table 6: Challenges with the completion of the CAPS teaching schedule.

ITEM	CATERGORIES /THEMES	RESPONSES	PERCENTAGES
What challenges do you experience with the completion of the CAPS teaching schedule?	Time allocation is not enough to complete the CAPS teaching `schedule	35	70%
	Poor planning and management	10	20%
	No problem with completing the CAPS teaching schedule	5	10%

From the responses provided by teachers in Table 6 the following themes emerged from the analysis of results:

35 out of 50 respondents (70%) indicated that the time allocation is not enough to complete the CAPS teaching schedule. The teachers indicated that they struggled to gain sufficient time for teaching. 20% of the respondents complained that the school management was not good in planning the activities of the school using government policies. The management failed to implement policies and to work closely with the teachers. Hence, the poor planning and management led to teachers not being able to complete the CAPS teaching schedule. They indicated that science teachers failed to prepare tasks and use different styles or approaches in the teaching process. 10% of respondents said that they don't have any problem to complete the CAPS teaching schedule. They indicated that they are comfortable and they know how to use the time that is allocated in the CAPS schedules.

Table: 7 Understanding of the learner-centred classroom as advocated by CAPS.

ITEMS	CATERGORIES /THEMES	RESPONSES	PERCENTAGES
What do you understand by the learner-centred classroom as advocated by CAPS.?	Need to engage learners in the learning and teaching environment	30	60%
	Encourage independent and critical thought, i.e. only through responding to questions asked by their teachers.	11	22%
	Promotes team work among both the teachers and learners.	5	10%
	Few teachers use the traditional approach.	10	8%

Responses of teachers to item 2 of the questionnaire as displayed in Table 7 were as follows:

All the respondents (100%) showed that they understand the learner-centred classroom as advocated by CAPS.

60 % of respondents indicated the importance of engaging learners in the learning and teaching environment. Teachers should therefore provide an opportunity for the learners to interact with one another in order to clarify their own thinking through communication with others so that they can understand the content.

both teachers and learners.

8% of respondents indicated that teachers develop critical thinking strategies around learning and teaching strategies in the classroom.

20% of respondents believed that they have moved away from the traditional method and emphasized the constructivism approach.

Table: 8. Perceptions about the subject matter in CAPS.

ITEMS	CATERGORIES /THEMES	RESPONSES	PERCENTAGES
Describe how you perceive the subject matter in CAPS	No link of topics between grade 10 - 12 syllabus	12	24%
	Content knowledge and pedagogical knowledge gap` in Physical Science.	28	56%
	Comfortable with subject matter.	4	8%
	Challenges with the teacher's use of language.	6	12%

The responses of teachers in Table 8 are summarized as follows:

24% of respondents indicated that there was no link between the grade 10 and grade 12 syllabi. That means no continuation of topics from grade 10 to 12.

56% of respondents reported that there is a content gap` in Physical Science.

8 % of few respondents indicated that they are comfortable with the subject matter.

12% of teachers noted challenges with regard to language usage

Table 9: The views on the pacing of CAPS (i.e. time allocated to aspects in the syllabus)

ITEMS	CATEGORIES /THEMES	RESPONSES	PERCENTAGES
What are your views on the pacing of CAPS i.e. time allocation versus the aspects in the syllabus.	Time allocation is problematic	20	40%
	Need more time for teaching and to complete the syllabus	17	34%
	Some teachers complete the syllabus in time.	13	26%

Regarding item 4 of the questionnaire all respondents (50) were in agreement about the time allocation in the CAPS syllabus. The following responses are captured in Table 4 and Figure 4 above:

40% of respondents indicated that the time allocation is problematic in CAPS. The respondents felt that the demand of the syllabus versus the short time available was a major problem. It is very difficult to finish the syllabus.

34% of respondents said that there is a need for more time for teaching (morning classes, Saturday classes, holiday classes and afternoon classes) so that the syllabus can be completed.

6% of respondents indicated that some teachers complete the syllabus in time.

ITEMS	CATEGORIES /THEMES	RESPONSES	PERCENTAGES
What resources do you have access to that affect teaching?	Mostly use traditional resources (for example, chalkboard and textbook)	20	40%
	Some teachers use laptops or computers. Not all teachers are familiar with charts, simulation etc. There is limited exposure to libraries or the internet and research material.	16	32%
	Not enough furniture	7	14%
	Some schools have few textbooks and no laptops	4	8%
	Shortage of classrooms. (overcrowded)	5	10%

From Table 10 above, 40% of respondents mostly used traditional resources, for example, the chalkboard and textbooks. They said that textbooks are the most familiar print resources for the teachers and learners. Some reflected that they have limited textbooks in their schools while others said that textbooks were not delivered on time.

32% of respondents complained that in schools with laptops, simulations like videos, USB overhead projectors and CD, those laptops were used by the Heads of Departments. Many teachers struggled to gain access to resources like computers or laptops. They noted that the department of education sent many charts and posters to their schools.

8% of the respondents complained that there was no enough furniture in schools.

10% of respondents indicated that in their schools there was a shortage of classrooms. They said that this posed a problem with regard to the teacher-learner ratio. In elaborating on this point, teachers felt that classes had too many learners and as a result the principles of the CAPS could not be implemented effectively.

ITEMS	CATEGORIES /THEMES	RESPONSES	PERCENTAGES
Describe the resources you have for practical work.	Some schools had no laboratories.	16	38%
	Shortage of materials (equipment, incomplete science kit, experimental worksheets, chemicals have expired etc.)	27	54%
	No electricity	7	14%

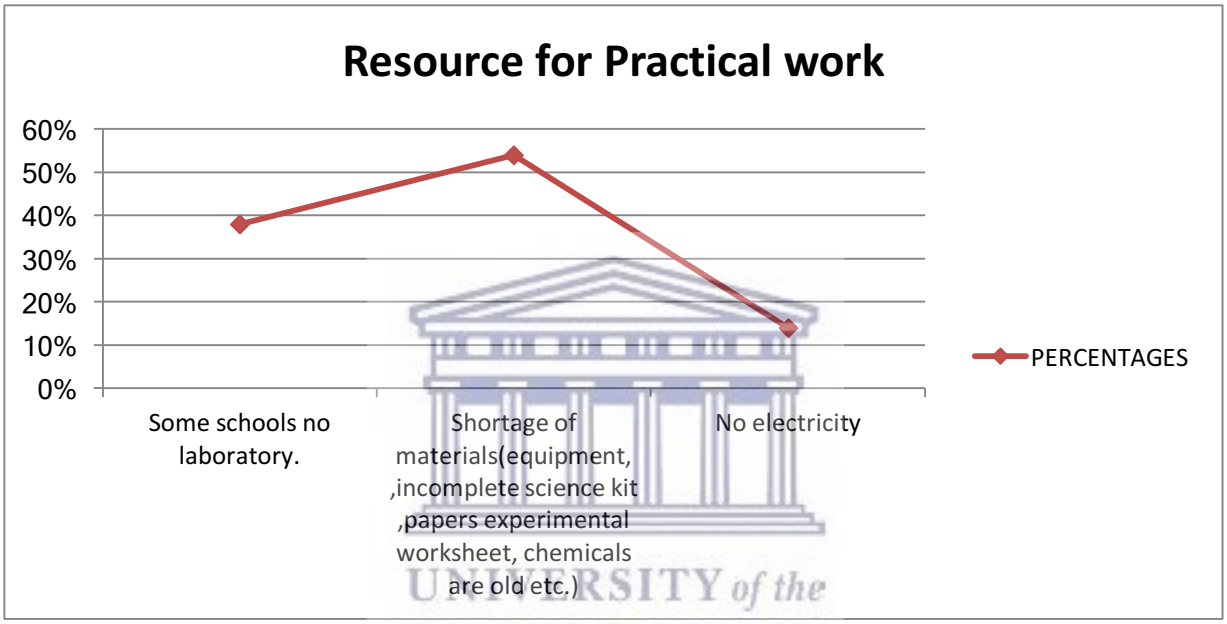


Figure 2: The distribution of resources for practical work

The results captured in Table 11 and Figure 2 above shows that:

38% of respondents indicated that their schools experience problems with the lack of laboratories.

54% of respondents indicated that there is a shortage of materials (equipment, incomplete science kit, papers for experimental worksheets, chemicals are old etc.)

14% of respondents said that many school have a problem with regard to electricity.

Table 12: Views on the assessment tasks prescribed in CAPS

ITEMS	CATEGORIES /THEMES	RESPONSES	PERCENTAGES
What are your views on the assessment tasks prescribed in the CAPS?	Many informal and formal tasks could not be marked on time	11	22%
	Prescribed assessment tasks help the teacher to develop the learner reach high cognitive levels	12	24%
	Assessment tasks develop the teachers' assessment skills and communication skills.	7	14%
	A problem with practical work assessment	22	44%

The responses of item 7 as portrayed in Table 12 clearly showed a great divergence regarding their views about assessment tasks prescribed by CAPS in Physical Science.

22% of the respondents viewed assessment tasks as challenging to prepare and that many informal and formal tasks are not marked on time.

24% of the respondents view prescribed assessment tasks as helping learners to develop high cognitive levels.

14 % of the respondents were aware that assessment tasks help the learners to develop their assessment skills.

44% of the respondents indicated that there was a problem with assessment of learner practical work.

ITEMS	CATEGORIES /THEMES	RESPONSES	PERCENTAGES
What are your experiences with the CAPS moderation process?	Understanding of the content of the policy	10	20%
	Poor performance of learners	4	8%
	Encourage teacher to work hard (in teaching and assessment). Keeps them as "friends" of CAPS document.	14	28%
	Moderation process is not genuine at school level (not properly done)	17	34%
	No qualified teachers to moderate	5	10%

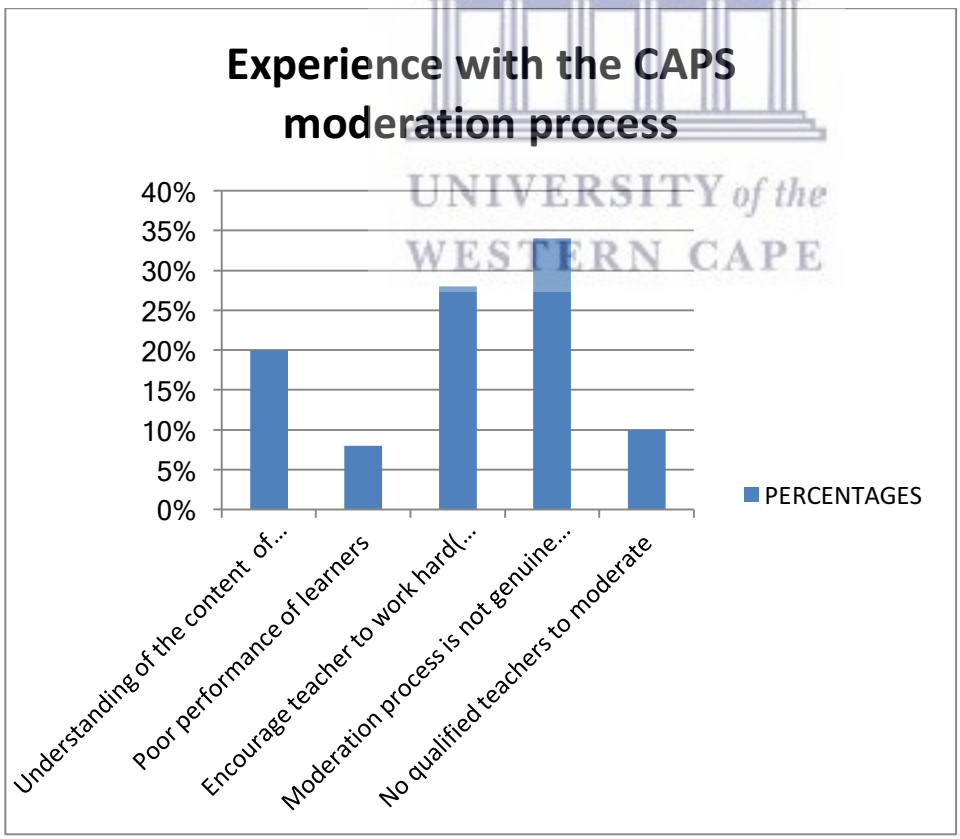


Figure 3: Teacher experiences with application of CAPS during moderation of tasks

CAPS document.

20 % of the respondents indicated that there was not enough time to manage requirements for performance because they submitted the learner portfolio and master portfolios late.

8% of the respondents expressed the view that they knew exactly what is expected of them and that the content was clearly defined and they understand the content of the policy. They used the CAPS document as a reference tool for teaching.

28% of the respondents encouraged teachers to work hard (in teaching, marking process, assessment) in order to keeps them as friend of CAPS document.

34% of the respondents said that the moderation process is not genuinely done at school level (not properly done).

10% of the respondents complained that there were no qualified teachers for moderation because some teachers are not trained for Physical Sciences and they taught other subjects.

Table 14: The views on the value of the CAPS training workshops

ITEMS	CATEGORIES /THEMES	RESPONSES	PERCENTAGES
What are your views on the value of the training workshops?	Not beneficial (leave most questions unanswered).	5	10%
	Workshops are fruitful.	8	8%
	Time limited for CAPS training workshops (i.e. It was facilitated over a 3–days period only	14	28%
	No workshops that are based on practical work.	23	46%

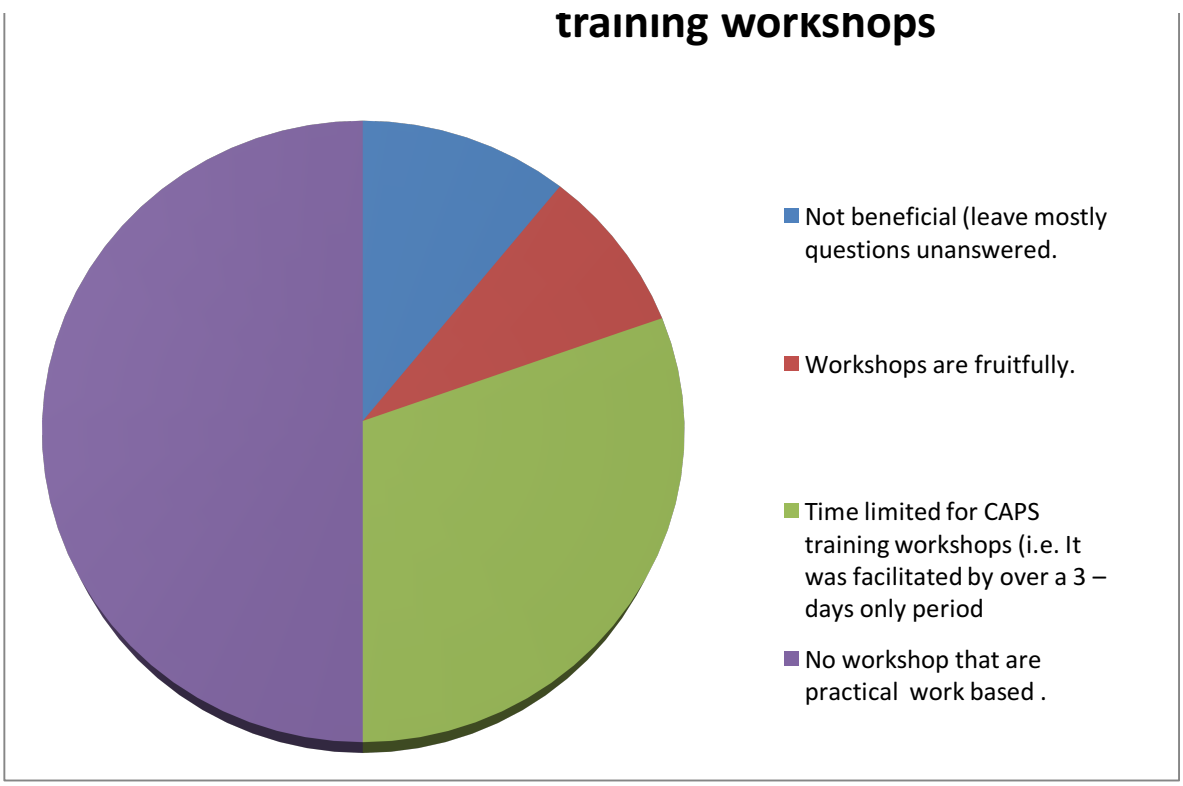


Figure 4: A pie-chart on the value of CAPS training workshops

The responses of teachers in Table 14 and Figure 4 above could be summarized as follows:

10% of the respondents said that the workshops were not beneficial as they leave most of their questions unanswered.

8% of the respondents said that workshops are fruitful. They gained the knowledge of the Physical Science theory.

28% of the respondents said that time were limited for CAPS training workshops (i.e. it was facilitated over a 3-day period only).

46% of the respondents said that no workshops were conducted that are practical work based.

ITEMS	CATEGORIES /THEMES	RESPONSES	CENTPERAGES
What are your experiences with the CAPS cluster moderation and subject meetings?	Teachers avail themselves for moderation in the clusters, some make excuses and as a result it is rare to find all of them.	18	36%
	Encourage teachers to use the guidelines effectively	7	28%
	Opens room for sharing ideas between experienced and newly qualified educators in order to discuss the challenges in some topics.	10	20%
	Failure to record marks	8	16%
	Subject is beneficial when the teaching strategies, examination skills to assess learners (e.g. teachers set test) are shared.	7	15%

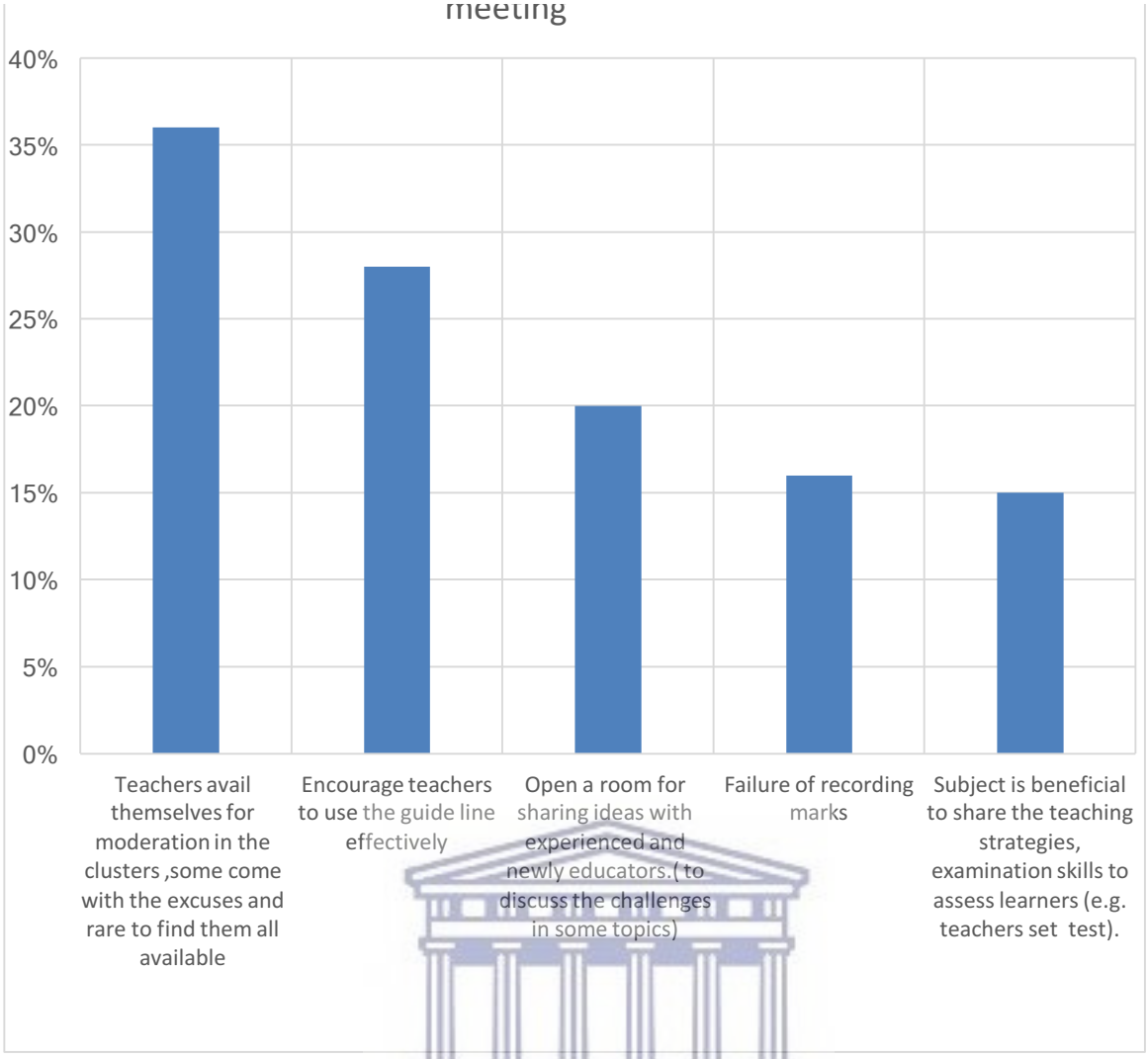


Figure 5: Percentage versus experience graph

36% of the respondents said that teachers avail themselves for moderation in the clusters, some have excuses and as a result it is rare to find them all available.

28% of the respondents said that they encourage teachers to use the guidelines effectively.

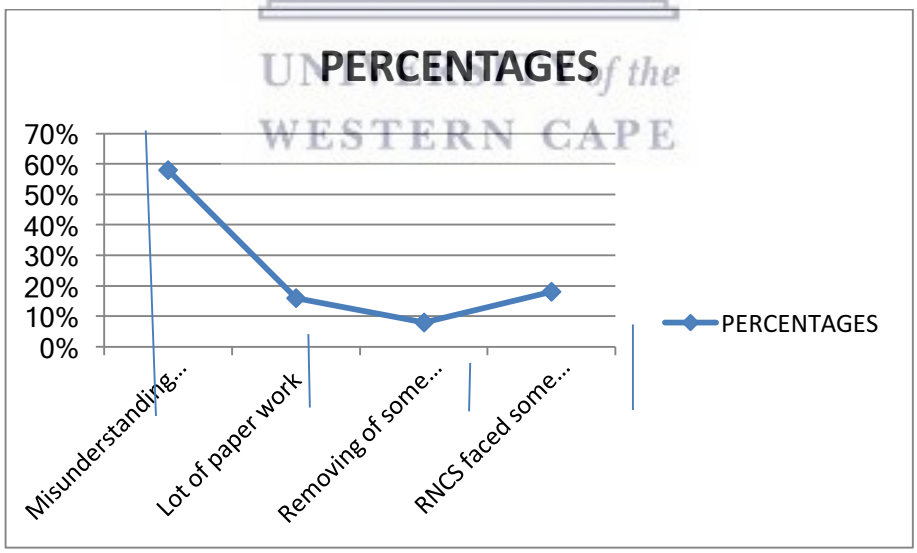
20% of the respondents said that it opens room for sharing of ideas between experienced and newly qualified teachers, and to discuss the challenges in some topics.

16% of the respondents said that they were failing in recording marks. They also emphasized that there was no training for new changes on the recording of marks in various tasks that are reflected in CAPS.

strategies, examination skills to assess learners (e.g. teachers' set common papers like controlled test) are shared among teachers.

Table16: The challenges in the change from the RNCS to CAPS.

ITEMS	CATEGORIES /THEMES	RESPONSES	PERCENTAGES
What were the challenges in the change from the RNCS to CAPS.?	Misunderstanding of implementation of various curriculum policies up to CAPS	29	58%
	A lot of paper work	8	16%
	Removal of some topics and addition of new topics	4	8%
	RNCS faced some implementation problems similar to CAPS (i.e. work in under-resourced classrooms	9	18%



58% of the respondents said that they misunderstood the implementation of various curriculum policies up to CAPS because there was limited and insufficient time for workshops

Consequently, we only do the relevant tasks for moderation.

8% of the respondents suggested that some of the topics be removed and new topics added.

18% of the respondents said that RNCS faced some implementation problems similar to CAPS, (i.e. working in under-resourced classrooms).

Table 17: Improvements in the Physical Science CAPS curriculum.

ITEMS	CATEGORIES /THEMES	RESPONSES	PERCENTAGES
Do you feel that CAPS has brought an improvement in the Physical Science curriculum? Motivate your views.	CAPS has brought an improvement	16	32%
	No improvement in CAPS because high failure rate in Physical Science still exists	19	38%
	There is little improvement in Physical Science using CAPS (not teacher centred)	16	32%

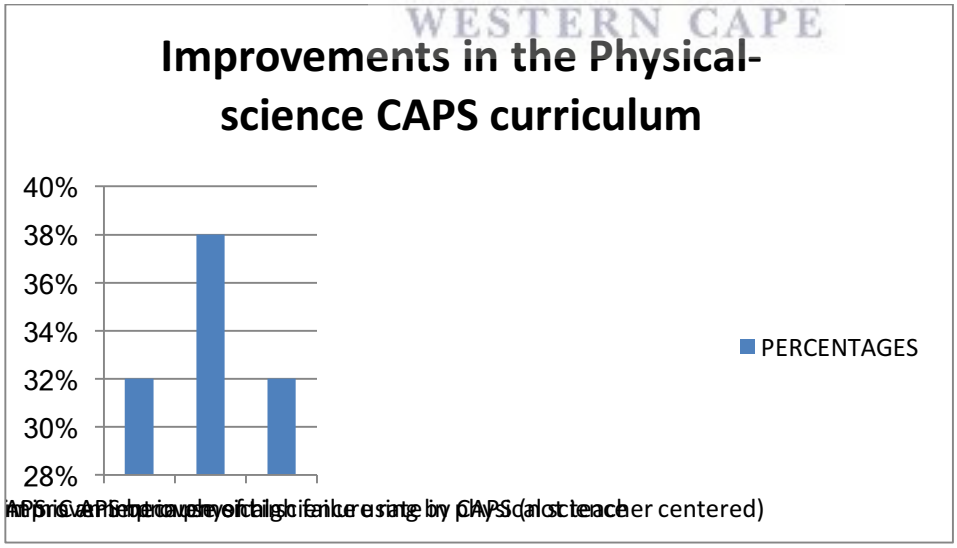


Figure 6: Content driven by curriculum graph

Respondents provided different feedback to this question as given below:

that some schools can afford to teach effectively because of the small numbers in the classroom. They managed to use the constructivism approach effectively.

36% of the respondents indicated that there is not yet an improvement in CAPS because the high failure rate in Physical Science still exists

32% of the respondents said that it is difficult to use the CAPS document to ensure that everybody can improve the results because the curriculum has moved away from a teacher- centered approach to a learner- centered one.

Table 18: How CAPS has enhanced achievement of learners in Physical Sciences.

ITEMS	CATEGORIES /THEMES	RESPONSES	PERCENTAGES
In what ways do you feel CAPS has enhanced achievement of the learners in Physical Science?	Use of indigenous knowledge.	9	18%
	Application of various teaching styles in the classroom.	18	36%
	Use of different assessment techniques to keep the learners occupied.	23	46%

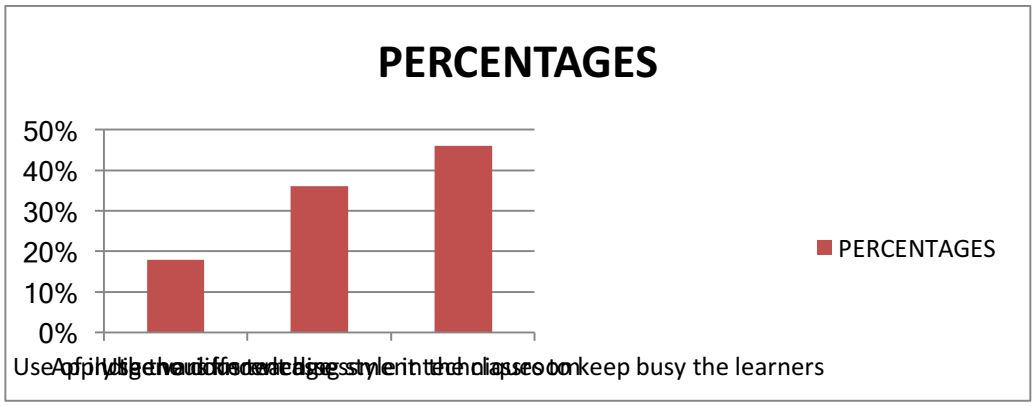


Figure 7: Percentages of distribution of responses for item 13 in the interview schedule

36% of the respondents said that teachers apply various teaching styles in the classroom. Teachers were not in a position to explain these changes properly and left the workshops confused.

46% of the respondents said that the use of different assessment techniques helped to keep the learners occupied.

Table 19: CAPS has negatively affected achievement of learners in Physical Sciences.

ITEM	CATEGORIES /THEMES	RESPONSES	PERCENTAGES
In what ways do you feel CAPS has negatively affected achievement of your learners In Physical Science?	No grading of learners (learners are doing the same syllabus and are not separated into higher and standard grades)	12	24%
	Pass mark of 30% is very low	8	16%
	Conduct experiments or practical work without resources.	25	50%
	Some teachers were not trained to teach Physical Science	3	6%
	Inadequate training with regard to the use of new technology e.g. recording of marks using a computer.	2	4%

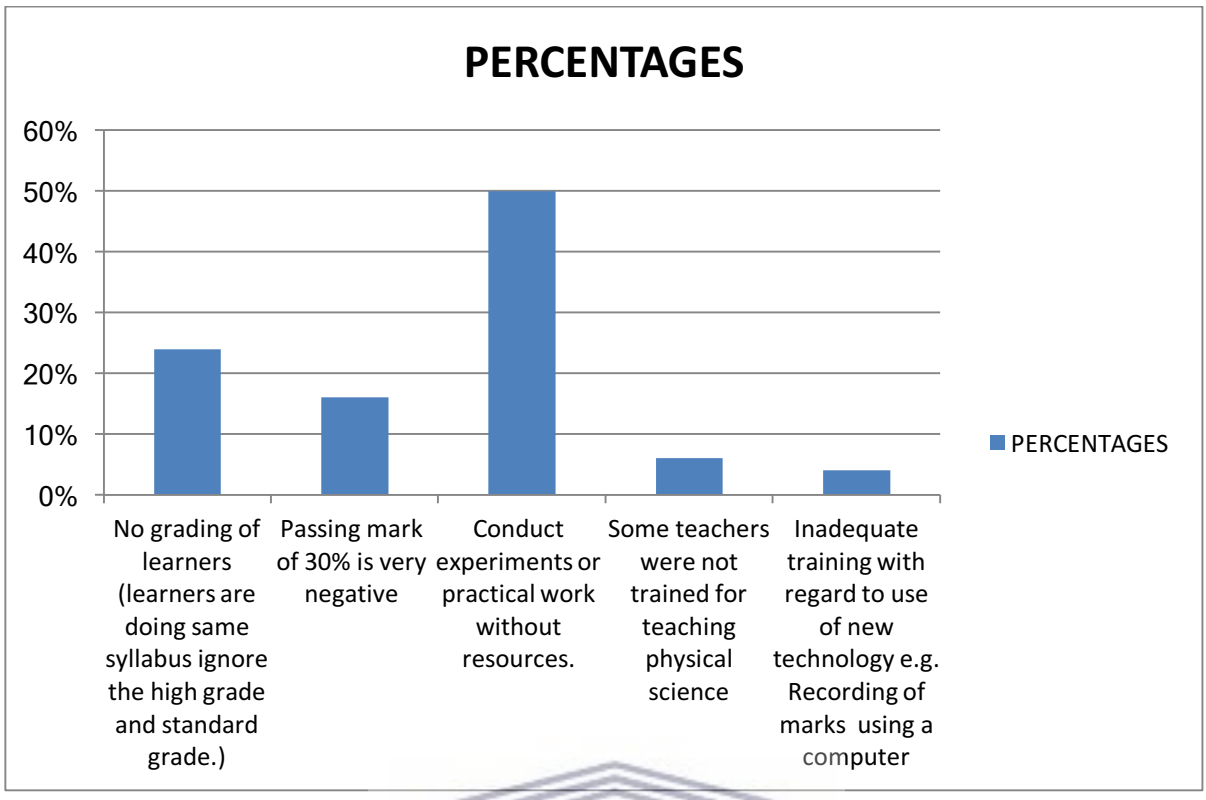


Table 19 display the emerging categories of themes on item 1 of the interview schedule and responses of teachers given below:

All the respondents (100%) commented that CAPS has negatively affected the achievement of their learners in Physical Science.

24% of the respondents said that non-grading of learners is not helpful. Learners are doing the same syllabus and are not separated into higher and standard grades.

16% of the respondents complained that the pass mark of 30% encouraged the learners and teachers to be lazy in their work and undermine the high standards required for University entrance.

50% of the respondents indicated that the emphasis on doing experiments or practical work according to the CAPS was difficult without considering the necessary resources in all schools.

6% of the respondents said that some teachers were not qualified to teach the Subject and that might cause lower achievement of learners in Physical Science.

use of new technology (e.g. recording of marks incorrect in the CASS schedule etc.).

Table 20: The ways in which CAPS increased motivation among learners when compared to the old curriculum.

ITEMS	CATEGORIES /THEMES	RESPONSES	PERCENTAGES
In what ways has CAPS increased motivation among learners when compared to the old curriculum?	Involve learners in practical work activities	37	74%
	25% of CASS contribution towards learners' progress	11	22%
	Engage them in extra co –curriculum activities like science club, mini quiz, science expo, study tour etc.	2	4%

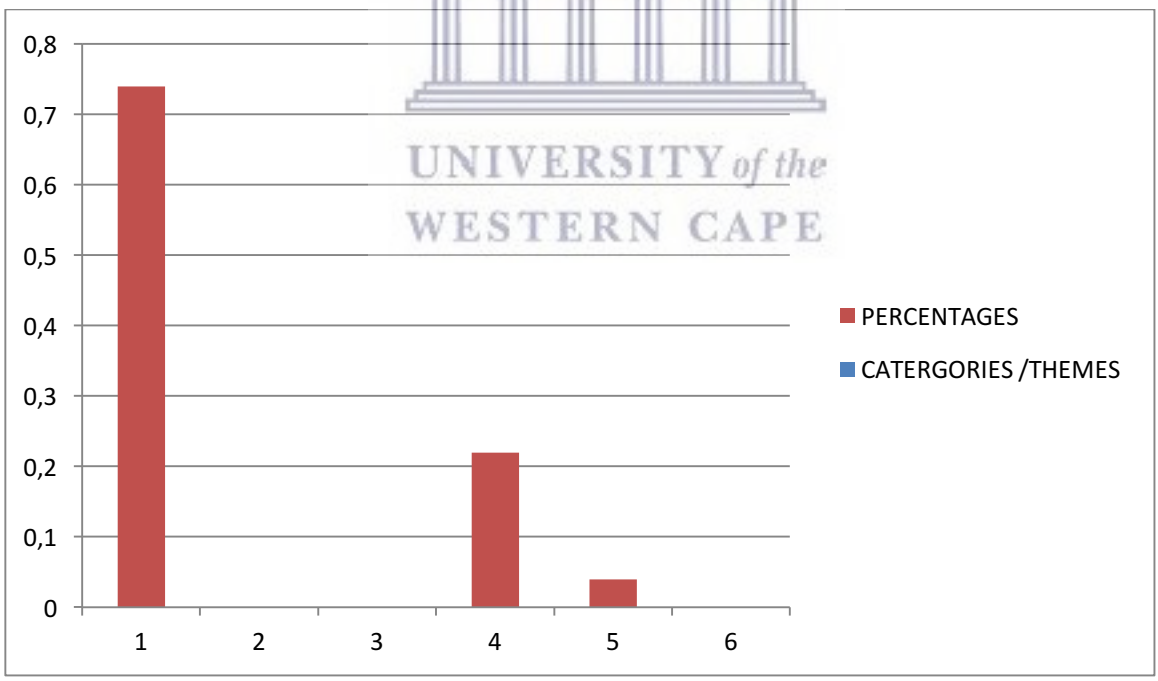


Figure 8: Ways in which CAPS has motivated learners

74 % of the respondents indicated that teachers encourage learners in practical work activities.

22 % of the respondents said that 25% of CASS contributed towards learners' progress.

4% of the respondents said that teachers must engage them in extra co–curriculum activities like science clubs, min-quiz competition, science expo, study tour etc.

Step 2: Interview schedule

The researcher randomly selected FOUR respondents from the 50 respondents that participated in the first stage. During the second stage, the researcher focused on the interview schedule. Four respondents were coded as Teacher A, teacher B**,** teacher C and Teacher D. The interview schedule consisted of ten questions and are presented below.

1. How do you experience using CAPS document to teach Physical Science?

School Teacher A indicated that the CAPS document clearly outlines the topics and the depth of the knowledge to be done in each grade. Teachers view CAPS as a policy that gives the educator more direction and guidance when compared to teaching which was lacking in the RNCS and C2005.

School Teacher B complained that the CAPS document confuses teachers because they are not clear as with the other previous curriculum policies. There is a lot of paper work, it has not been reduced. There is a lack of assistance in planning, instead there is lot of criticizing coming from inside and outside the school by stakeholders." *I don't want to talk too much about… because this issue is boring .It makes me become emotionally .The requirements of these two curriculum are the same ,they just change the terminology work schedule now called scheme of work*."

School Teacher C said that teachers are struggling to teach Physical Science effectively because some schools have a shortage of materials. "*I have only 25 textbooks as against 89 learners".* According to the CAPS document each learner must have a textbook. The teacher said that CAPS reduces the chances of not

teaching in the medium of instruction. It emphasizes the advantage of experienced educators to use English according to the language policies to improve better understanding of lessons taught. Teachers provided supplementary subject matter which increased the enthusiasm for school science to motivate learners.

School Teacher D commented on the experience using CAPS document by indicating certain aspects that need to be considered before implementing CAPS. She noted that a shortage of well-qualified and enthusiastic science educators and learners gives a poor image of science related careers. Foreigners are recruited to teach mathematics and science showing that there is a problem in schools (Govender, 2007).The teacher also indicated that it is not easy to prepare a lesson.

2. Has CAPS enhanced achievement of your learners in Physical Science?

School teacher A agreed that when the practical experiments accompany each topic it makes learning in Physical science very interesting to the learners.

School teacher B said that learners fail to pass Physical Sciences with good levels. She said '*Most of our learner's get 30%, which is level 2, which drops the numbers of Physical Science learners with good results in schools. The cause of that is the failure of the practical application of this knowledge in everyday life and that makes Physical Science not to be liked by learners".*

School teacher C responses indicated that the poor performance of learners in Physical science was very high ever since CAPS was implemented as compared to the old curriculum. The previous curriculum also involved scaffolding in the classroom.Teachers failed to implement scaffolding effectively (Shabani,Khatib and Ebadi (2010) .School teacher D showed a positive attitude by referring to his previous results in Physical Science.

3. What are the factors that affect the teacher's ability to implement CAPS in Grade 10 Physical Science?

School teacher A showed that if teachers have the ability to conduct experiments, learners are motivated by hands-on activities.

tasks and some tasks are not marked by teachers. The development of textbooks and other LSTM need to be centralized at National level."

School teacher C indicated that the teachers' ability in the implementation of CAPS is affected by the availability of laboratories, apparatus and chemicals.

School teacher D's response was similar to the responses of teacher A and C. He emphasized the teacher's ability to link classroom teaching with examples of the practical application of concepts in everyday life.

4. Are you satisfied about the content displayed in the CAPS document? Explain.

School teacher A answered that question by showing a positive attitude and explained the importance of certain topics that are done in grades 10-12 displaying continuity of knowledge such as in electric circuits, electromagnetism, electrochemical reaction, etc.

School teacher B indicated that he was not yet satisfied with the content displayed in the CAPS document because some teachers are not well trained in certain topics. Specific topics also need teachers who are trained in tertiary institutions like the University.

School teacher C said that satisfaction about the content is not yet achieved because CAPS just shows the guideline and not the details of how to teach Physical Science content. It indicates the treatment of content and patterns of teacher talk were built into the design of such sequences.

School teacher D did not provide any response. Instead, the teacher had a serious face when teacher A and C responded. At the end of teacher C's response, teacher D commented, '*We receive medication from a doctor and the direction of using it without pointing out the benefits'.*

5. How are learners motivated in CAPS as compared to the old curriculum?

School teacher A: There is no higher grade or standard grade, the content depth is the same for every learner. The learners only differ in different in levels of performance.

strategies of social interaction with colleagues (Dahms et .,2008).

School teacher B indicated that learners are interested in CAPS because it changes their attitude towards Physical Science by engaging them in hands-on activities.

School teacher C said that they have support expressed on teaching and learning methods in the curriculum. Assessment is all highly influential in the learners' attitudes towards science as is the quality of the teaching that they experience.

School teacher D emphasized that CAPS uses the constructivism approach, not a traditional approach like the old curriculum. Teachers view CAPS as more focused on the subject matter and helping with guidance for teachers. They also found the document to be instructive.

6. What are your views with CAPS cluster moderation and subject meeting?

School teacher A indicated that cluster moderation is of a good standard, but teachers should always be discouraged from doing shadow marking. Teacher A also indicated that there are some changes now because of a new Subject Advisor and the Subject Advisor is well trained. It is not easy to side step work as we used to previously. There are new strategies that are employed in every session.

School teacher B: Wow, Cluster moderation is a boring process because some teachers just pass cards; they come late and without bringing tasks.

School teacher C's response expressed that there was a problem in using formative assessment to improve learners' performance.

School teacher D indicated that teachers fail to attend subject meetings unless the core business of the day is about the discussion around memorandums for marking the June and trial examination. Teachers that attend subject meetings are mostly those that are members of subject committees.

document? Explain.

School teacher A said that she has already alluded to the continuity of topics from grade to grade.

School teacher B said that time allocation for content is a huge problem to many matric plus a three-year's qualification (M + 3) teachers, in the sense that they struggle to do the revision of work covered.

School teacher C indicated that the pace of content as outlined in the CAPS document is not a true reflection in terms of practicality; it needs to motivate teachers to engage themselves in extra time for teaching.

School teacher D showed that there is satisfaction about the pacing of the content since the CAPS document emphasizes the importance of the order in which practical lessons should be conducted effectively and to allow learners to do practical work individually or in groups. "*Teachers are not able to complete the syllabus on time. Teachers are frustrated with content. Learners also have to cope with the vast content.*"

8. What section of the curriculum do you feel is most difficult for you to teach in Physical Science?

School teacher A indicated that the topic on Electromagnetism, more especially where there are no apparatus to conduct experiments, is difficult. The concepts become too abstract.

School teacher B showed a stressful face when she received that question. Teacher B mentioned that the content is provided as part of teacher education in colleges but not at Universities.

School teacher C complained saying that there is no problem in teaching Physical Science, but time is not enough to expose learners to indigenous knowledge.

is the feeling that theory is difficult in certain sections of the curriculum because they don't have a clear understanding of chemistry topics, e.g. redox reactions.

9. Do you feel that you have sufficient resources to complete the practical experiments as required by CAPS? If not, explain how the lack of resources affects your teaching.

School teacher A indicated that she only has a mini-laboratory which has limited equipment and chemicals.

School teacher B agreed with school teacher A by indicating that a clear understanding of the conducting of most experiments cannot be given as they needed to improvise or find alternative chemicals to the ones in the worksheet, for example, in acids and bases.

School teacher C: The practical work is not conducted in my school. I theorize Physical Sciences.

School teacher D said that he experiences no problem with resources; the problem is the management of time and the lack of support from school managers and parents.

10. Do you find the training you received for the implementation of the practical components of CAPS is sufficient? Explain.

School teacher A said he did not receive any training in practical work, instead the department organized workshops on theory and teachers do not have a say about it.

School teacher B supported school teacher A by saying that the developers of the CAPS document sing the same song of doing practical work and assessing learners during the teaching time, but not even a single demonstration is given on how to do the practical activities in workshops.

School teacher D confirmed that they never received any training in practical work. Teacher D also expressed that practical work is a distinctive feature of Physical Science.

the lack of training was not helpful. Instead they say teachers need to involve learners in hands-on activities rather than theorizing the content.

4.4 Conclusion

The findings in this chapter were presented under the main research question and relevant literature was integrated where possible. In this chapter the researcher presented the results of the data from teachers' perspectives about the implementation of CAPS in the Butterworth District. The challenges that were experienced by teachers in rural and urban schools regarding challenges of CAPS implementation were also analyzed by the researcher. The researcher presented the data collected from Grade 10 Physical Science teachers. The data were collected from 50 teachers during cluster moderation and also conducted interviews with four school teachers. It is evident that teachers have challenges with implementing the CAPS document and it was difficult to complete the syllabus. This chapter also aimed to report on the relevancy of the findings. In Chapter 5 the discussion, conclusion and recommendations based on the results will be presented.

CHAPTER 5

DISCUSSION

5.1 Introduction

In this chapter, the researcher provides the discussion of the research findings presented in Chapter 4. The literature on teacher challenges that are experienced with the implementing of CAPS in grade 10 physical-sciences was used to provide the framework for the interpretation and discussion in this chapter. Firstly, the focus of the discussion was on teachers' perceptions of implementing CAPS in grade 10 physical sciences. This is within the aim of improving the strategic style of teaching and learning of the physical sciences content effectively. It also makes learners aware of their environment and equips learners with investigating skills relating to the physics and chemistry phenomena (DBE, 2011, p.8). As chapter 4 endeavoured to present the data from the viewpoint of the participants, the discussion that follows in this chapter will be guided by the principles of the interpretivist framework. The researcher discusses the themes by linking the table and figures of themes that are shown on stage 1 of the methodology (15 open-ended questionnaire and stage two (interview schedule). Secondly, the researcher discusses the remaining responses of teachers for stage 1 and stage 2 separately because those responses are different from each other.

5.2 Discussion and analysis of results of stage one

5.2.1 What challenges do you experience with the completion of the CAPS teaching schedule?

The findings for the challenges experienced by teachers on CAPS implementation are discussed in the themes listed below.

5.2.1.1 Time allocation (time factor)

The findings of this research in stage one indicated that the time allocation remains a serious challenge on the CAPS implementation as the teachers pointed out that they must conduct extra classes to cover up for the time to be used for teaching, assessment and remedial work. This was in agreement with the finding of Sibam (2014) where he reported that teachers felt it challenging to complete the CAPs curriculum with the prescribed time periods. They further explained that there is no

Time allocation for content is a huge problem to me, in the sense that I struggle to do the revision of work covered."

Another teacher argued that the time allocated does not match the workload assigned for practical work and pacesetters seem to allocate little time for the work to be covered. School teacher C said: "*the pace of content as outlined in the CAPS document is not a true reflection of what should be done against time allocated in terms of practicality; it needs or motivates us as teachers to engage in extra time for teaching."*

In the light of what has been highlighted by the teachers above, the time allocation for the content should be revisited by curriculum planers, policy makers and curriculum advisors.

5.2.1.2 Lack of resources

The research findings in agreement other researchers (Mokgato and Mji, 2006; Sibanda 2016) with showed that lack of resources means that CAPS implementation is impossible without resources. As per CAPS regulations, 25% of assessment comes from practical work and when there are no resources this requirement is not met. Other teachers cited that they have limited resources which also do not serve the purpose to allow learners to gain the required 25% from certain sections of Physical Sciences.

They further disclosed that they only teach theory and leave the practical section. School teacher A indicated that the topic on Electromagnetism, more especially where there is no apparatus to conduct experiments, is difficult and the concepts become too abstract. School teacher A indicated that she only has a mini-laboratory which has limited equipment and chemicals which makes concept development difficult.

School teacher B agreed with school teacher A by indicating that a clear understanding of the use of most experiments cannot be given as they needed to improvise or find alternative chemicals to the ones in the worksheet, for example, in acids and bases.

School teacher C: "*The practical work is not conducted in my school. I theorize Physical Sciences."* A few teachers indicated that their schools are well resourced but the problem is that there is no time allocated for practical work which renders the resources unserviceable. For example, School teacher D said that he experiences

no problem with resources; the problem is the management of time and the lack of support from school managers and parents.

From these findings, it is therefore advised that the teachers should be provided with necessary LTSM (Learner Teacher Support Material). Training of teachers on LTSM supplied should be provided to equip teachers with skills in how to use the material.

5.2.1.3 Incompetency and Improper training of educators

The findings of this study revealed that teachers did not receive proper training for CAPS implementation. Similarly, Abrahams and Saglam (2010) and Batwini (2009) disclosed that the practical work resources were dumped in their schools without any form of training which made them unable to implement CAPS. The lack of training made them incompetent in the physical sciences hence the poor learner performance. For example, school teacher A said that he did not receive any training in practical work, instead the department organized workshops on theory and teachers do not have a say about it.

School teacher B supported school teacher A by saying that the developers of the CAPS document emphasise the necessity of doing practical work and assessing learners during the teaching time, but offer not even a single demonstration of how to do the practical activities in workshops. Furthermore, school teacher D confirmed that they never received any training in practical work. Teacher D also expressed that practical work is a distinctive feature of Physical Science. Teacher development workshops need to be conducted to balance the level of competency of teachers.

5.3 Assessment tasks prescribed by CAPS?

Teachers have trouble with using Caps documents and refer to the teaching schedule A to teach Physical Science. For item 1 was 2.1(see figure 2 P 63) and item 2 was 3.1(see p 64) indicated that the response of teachers used the different percentage. According to the responses by teachers, the following themes emerged from the analysis of results patterns, and themes in the data were organized through use of the items in the questionnaire. Thus, categories for organization of themes and patterns were predetermined (MacMillan &Schumacher, 1993). Both in the extraction and presentation of themes, the researcher used emic categories. Therefore, the wording

used in the narration of each item in open-ended questionnaire and the interview schedule were those of the respondents of the interviewees (4 teachers). Many teachers indicated that they understood the time allocation is not enough to complete the CAPS teaching schedule. The CAPS tabulate only the topics and reflect the time for finishing the topics without looking the other external factors that will affect teaching. For example, time is taken up by extra mural activities which are part of education in school. That means teachers struggled to gain sufficient time for teaching formal and informal assessments. It was also discovered that teachers have problems completing the syllabus and there is limited time for revision. Teaching content topics was not enough as they had difficulty with evaluating learner's performance due to time constraints (See Table, p 74).

A few respondents complained that management was not good in planning the activities of the school using government policies. Kriek and Grayson (2009) also found in their study that school management failed to implement policies and to work closely with teachers. Hence, the poor planning and management led to teachers not being able to complete the CAPS content within the stipulated teaching schedule. (Bantwini, 2009). The management weaknesses further indicated that science teachers failed to prepare tasks and use different styles or approaches in the teaching process. The CAPS implementation is clearly a challenge, not only to individual teachers, but also for Senior Management team (SMTs) within the schools as well as the District Managers. If there is high level of poor management in the implementation of CAPS, it is likely to be detrimental to the performance of the teachers as well to the outcomes of the learning process (Bantwini, 2009).

The respondents indicated that the lack of support from DoE was a major challenge amongst teachers; for instance, the DoE officials called a lot of meetings during tuition time without viewing the CAPS teaching schedule. Those meetings were not scheduled in the annual plan. DoE imposed a number of new policies without the necessary training of teachers and did not empower teachers to become competent and confident educators. This showed that school improvement was not supported by various departments to monitor the science teachers in the implementation of CAPS. This leads to things done on the spur of the moment.

Only 10% of teachers confirmed that they finished the syllabus within the required CAPS teaching schedule. They understood the guideline for teaching Physical

Science, even if the new curriculum does not provide details about the content. They indicated that they are comfortable and they know how to use the time that is allocated in the CAPS schedules. The respondents mentioned that they knew how to schedule the time for teaching, doing practical work, assessment, revision and cover remedial work on time. It was therefore clear to the researcher that the fifty (50) respondents that took part initially in this research study were the well-informed respondents. The researcher decided to gain more information by selecting four teachers from the fifty respondents for this research study. The researcher used the sample of teachers as stage two. These views of the respondents linked up very well with Fouche & Delport (2011).

5.4 Learner-centred classroom as advocated by CAPS

For item 2 (see figure 2, p 64), it was indicated that many respondents (100%) showed that they understood the learner-centred classroom as advocated by CAPS. Teachers indicated the importance of engaging learners in the learning- teaching environment. Teachers should therefore provide opportunity for the learners to interact with one another, and clarify their own thinking through communication with others to understand the content. (Mahlong, 2010). Teachers were of an opinion that a learner-centred approach places the responsibility on the shoulder of the learners instead of the teacher. The findings also supported by the study by Mda and Mothata (2000) indicated that the CAPS curriculum is a curriculum policy which is used as guide and instructor for teachers in teaching and learning Physical Science effectively to achieve the better results. A few (22%) of respondents mentioned that the learner–centred approach assisted learners to be independent. Teachers encouraged learners to participate in lessons and learners were free to ask any question even if it is not fruitful, for instance, learners ask questions which are based on false assumptions. The teacher has a critical role of helping learners to think carefully about the question and drive it to the real conclusion where appropriate. About 10% of respondents believed that learner- centred teaching promotes team work for both teachers and learners. Teachers showed that they were willing to form teams of information sharing and ideas of the subject matter. Furthermore, the findings confirmed that, by using the learner-centred approach, teachers have popular views that constructivism is synonymous with the learner- centred approach. Both approaches focus upon individuals building up representations of their knowledge, which is tested against experience.

Due to shortage of resources, teachers borrowed textbooks, chemicals and apparatus from neighbouring schools. Teachers encouraged learners sometimes to work as groups to share their ideas. The researcher's finding emphasized that the understanding of teachers about this approach, CAPS has a big challenge because one of the requirements of CAPS is to form small groups in a learner- centred approach. Small groups refer to academic tasks and activities undertaken by a group of learners, which enable a degree of discussion, reflection and collaboration. Other respondents indicated that teachers develop critical thinking strategies around learning and teaching strategies in classroom. Teachers believed that they have moved away from the traditional method and emphasize constructivism approaches.

Describe how you perceive the subject matter in CAPS &What are your views on the pacing of CAPS (i.e. time allocation to aspects in the syllabus)?

Regarding tables 3 and 4 (pg 67) of the questionnaire all respondents (50) agreed about the time allocation in the CAPS syllabus. The respondents indicated that the time allocation is inconvenient in CAPS. The respondents felt that the demand of the syllabus versus the short time available was a major challenge. It is very difficult to finish the syllabus. The findings of this research indicated that teachers fight the time instead of implementing CAPS effectively while teaching. They needed to cover the syllabus within the period of CAPS schedule. The respondents stated that there was no link between the grade 10 & 11syllabus. That means no continuation of topics from grade 10 to 12. For example, in Physical Science Paper One, linkage of topics are mechanics (equations of motion from grade10 link with Grade 12, Electricity grade 10,11 and 12). Many teachers showed a huge frustration due to content gap in physical sciences. Other respondents are not comfortable with the teaching of physical sciences. The respondents confirmed that the subject content knowledge of these physical sciences teachers from various schools was not sufficient. The research study was based on the most basic content that has been in the curriculum for many years. The addition of new content, such as electronics, complicated the situation even further since most teachers did not have any prior training in some of the new topics. Teachers' views and beliefs on the teaching and learning of physical sciences revealed the need for resources and training, and that their learners enter grade 10 without the necessary skills they ought to have developed in lower grades. Teachers expressed

their need for proper and appropriate training by professionals and experts to deal with the content and methods of teaching. This was further indicated in that teachers experienced a problem even with different learning areas of Physical Science since in grade10the Physical Science syllabus consists of new topics, for example, the researcher tried to bind the different responses in one bag in the sense that teachers had a problem in teaching Physical Science due to curriculum changes which resulted in teachers lacking confidence with the subject matter. They did not finish the syllabus on time. Teachers indicated that many of them had to offer up their well–earned holidays to prepare the Grade 10 learners to complete the syllabus and be ready for the final examination. The research finding indicated that some teachers did not have a complaint about the subject matter or syllabus if they had been well trained in a higher institution. Those who trained in college were not fit for the new topics.

The researcher's finding noted that some teachers experience challenges with language usage. Although many of the teachers experienced a problem with teaching Physical Science in English, CAPS emphasizes English as the medium of instruction in learning and teaching situations. Teachers had a negative attitude with regard to using English in science in terms of content, calculations and assessment; generally learners look forward and are excited to answer and ask questions in IsiXhosa. This language issue has not proven to improve learners 'performance in Physical Science since many of the teachers were rated as weak in subject knowledge because of the language. Teachers struggled to explain the content in English while teaching, as they had no clear idea of what was intended. In terms of textbooks which represent the syllabus and command what needs to be taught, they are compiled by government-appointed publishers. As a result, learners failed to answer the long questions in Physical Sciences examinations. (DoE in grade 12 Markers'Report,2016).

The education policies emphasized English as medium of instruction in schools. National policy in terms of textbook implementation clearly stated that language teaching and learning in the classroom should centre on learners, should decrease teachers' speaking time and should encourage learner's participation. It was not easy for Grade 10 teachers to adopt a learner–centred approach using English in implementing CAPS teaching Physical Science. Teachers therefore faced the huge challenge of providing both theoretical support and acting as corrective language experts to improve learner's language and capability and skills. (Gabela,2005 & Uys,2007).

5.5 Describe the resources you have for practical work.

In Table:5 there was a general feeling amongst teachers that teachers have various teaching resources to which they have access, but the research findings indicated that 40% of respondents mostly used traditional resources, for example, the chalkboard, textbooks and computers. They said that textbooks are the most familiar print resource for the teachers and learners. Others reflected that they have limited textbooks in their schools as some were not delivered on time.

32% of respondents complained that the school has laptops, simulations like videos and CD, but those laptops were used by the Head of Department. Many teachers struggled to gain access to a major resource like computers or laptops, videos, simulations. No training was provided. On the other hand, Mbugua (2011) identified the calculator as the most crucial resource for effective teaching of Mathematics and Science. These findings indicated that almost teachers guided learners to have and use a calculator in physical science.

Physical science resources which are relevant to the teaching of Project Work/Investigation are the resources which can be found in the home, in various chapters in a textbook like electric circuit, electrostatics et al. (Babtwini, 2009). Whether all teachers used calculators in their daily contact with learners, is part of the present study. In this regard, it is important to use Physical Science resources which are taken from real-life contexts to develop a good background in Physical Science concepts. Physical-science resources taken from real-life contexts provide a share of memory by allowing discussion that brings about, for example, acid-base reaction, homogeneous and heterogeneous mixtures. The findings of their study revealed that technology is an adequate tool for teaching both Science and Mathematics The teachers noted that the department of education sent many charts and posters to their schools. Some schools have access to computers and science laboratories but they have a challenge in using them correctly due to lack of training.

Eight percent of respondents complained that there was no enough furniture in schools Learners were suffering as it is difficult to be seated in comfort due to overcrowding.. Learners often share three to a desk even during the examination time for internal classes owing to shortage of classrooms. The learner ratio was also mentioned as a major problem in our schools. The respondents said that in the schools in the Butterworth Education District the teacher –learner ratio was 1:60 or even more at

principles of the CAPS cannot be implemented effectively.

The respondents mostly used traditional resources, for example, the chalkboard, furniture, classes, and textbooks. They said that textbooks are the most familiar print resource for the teachers and learners. The researcher's findings highlighted that CAPS is knowledge construction by the learner using a variety of resources. This resource –based curriculum is a challenge to implement successfully in an environment where there are few functional school libraries. Teachers failed to use the charts and posters sent and instead learners play with them. The DoE failed to train teachers with the material they dumped in schools (Sibanda, 2016).

In Table:5 there was a general feeling amongst teachers that teachers have various teaching resources to which they have access, but the research findings indicated that 40% of respondents mostly used traditional resources, for example, the chalkboard and textbooks. They said that textbooks are the most familiar print resource for the teachers and learners. Others reflected that they have limited textbooks in their schools, some were not delivered on time.

32% of respondents complained that the school has lap tops, simulations like videos USB and CD, but those laptops were used by the Head of Department. Many teachers struggled to gain access, indicated as a major resource like computers or laptops, videos, simulations. Mbugua (2011) identified the calculator as the most serious resource for effective teaching of Mathematics and Science. These findings indicated that almost teachers guided learners to have and use some calculators in Physical Science even in the syllabus of grade 10 the rest of learners need a calculator. Resources which are relevant to the teaching of project work/investigation are those which can be found in the home, like the electric circuit, electrostatics and other such resources. Whether all teachers used calculators in their daily contact with learners, is part of the present study. In this regard, it is important to use resources which are taken from real-life contexts to develop a good background in Physical-Science concepts. Resources taken from real-life contexts provide a share of memory by allowing discussion that brings about, for example acid-base reaction, homogeneous and heterogeneous mixtures. The findings their study revealed that technology is an adequate tool for teaching both Science and Mathematics

Infrastructure was not in good in some school by looking to the various schools one of the findings there was no enough furniture in schools. Learners were suffering it is difficulty to sit alone or by two. In one desk learners are in threes even during the examination time for internal classes. There was a shortage of classrooms. The –learner ratio was also mentioned as a major problem in our schools. The respondents said that in the schools in the Butterworth Education District the teacher –learner ratio was 1:60 or even more at some schools They assured that the researcher that was not an exaggeration. In elaborating this point, teachers felt that classes had too many learners and principles of the CAPS cannot be implemented effectively. This was also part of the findings of Bantwini (2009).

The respondents mostly used traditional resources, for example, the chalkboard, furniture, classes, and textbooks. They said that textbooks are the most familiar print resource for the teachers and learners Teachers mentioned that schools have laptops, simulations like videos and CDs but those laptops were used by the Head of Department. Many teachers struggled to gain access to resources like computers or laptops. Others reflected that they have limited textbooks in their schools; some were not delivered on time. The researcher findings supported by Mahlong (2010) highlighted that CAPS is knowledge construction by the learner using a variety of resources. It has been discovered that this resource –based curriculum is a challenge to implement successfully in an environment where there are few functional school libraries. They noted that the department of education sent many charts and posters to their schools. Teachers failed to use them instead learners play with them. The DoE failed to train teachers with that material, they dumped in schools.

Table 6: Resources for practical work. Teachers indicated a shortage of chemicals; equipment in laboratory activities that could have inspired involvement of learners in handling equipment is one of the factors that contributed negatively to the learning environment and teacher-learners' interactions. Teachers mostly resolved to leave out demonstrations due to lack of chemicals and equipment. Mostly schools are characterized by lack of equipment, chemicals, poorly behaved learners, while on the other hand there are good behaviours from the teachers 'side with most learner respondents indicating that their teachers always try to make the best of the prevailing situations in the laboratories. A teacher can show learners the result of a redox

When some reactions occur, an exchange of electrons takes place. It is this exchange of electrons that leads to the change in charge that we noted in grade 10 (chapter 18, reactions in aqueous solution). When an atom gains electrons it becomes more negative and when it loses electrons it becomes more positive. The researcher supported the opinion that teachers should not always complain about the unavailability of resources in school but should make every effort to improvise.

The DoE could play a greater role in creating positive, productive and enjoyable learning environments by supplying secondary schools with fully equipped laboratories to support the practical work as stated in the Physical Science syllabi but it does not. The three-item questionnaire used was rated by learners and teachers as effective; easy but not equal because some teachers indicated that no laboratory and equipment was available. They complained about the incomplete science kit and old chemicals. That means the government supplied unsuitable materials and it was not easy for teachers to do the experiment completely. Participants indicated lack of papers for experimental worksheets. Some respondents said that many schools have a problem regarding electricity. Teachers therefore have challenges with using technology in that they cannot use simulation to demonstrate experiments. The researcher's opinion is that teachers lacked training in how to use new technology, for example, lack of Computers was a direct reason for the heavy workload by teachers. The researcher was fortunate to receive training in the use of the computer in teaching and learning situations, having been trained in the ACE programme at the University of the Western Cape by Prof Hartley.

Table 7: Views on the assessment tasks prescribed by CAPS

The responses of Table 7 clearly showed a great divergence regarding their views about assessment tasks prescribed by CAPS in physical science.22% of the respondents viewed assessment tasks as challenging to prepare and many informal and formal tasks are not marked on time. The researcher's findings indicated that the challenge of assessment is influenced by physical resources such as classroom shortages that lead to overcrowding, availability of laboratories, teaching and learning materials and equipment. Teachers concentrated on formative assessment which has the potential to drive changes in teaching that can improve learning drastically. That

to do the daily assessment after teaching a lesson with the aim of checking or giving a feedback to learners as to their strengths and weaknesses and help them to develop strategies to improve their learning. CAPS emphasize assessment should be continuous, and cover internal and external issues pertinent to intended learning out comes (DoE, 2012). 24% and 10% of the respondents indicated that to assess learners, they help learners to develop high cognitive levels because using different styles of assessment developed their assessment skills. Teachers believed that it is important to consider the informal and formal assessment.

44% of the respondents indicated that there is a problem of practical work assessment of learners. The assessment of what has been learned must be closely matched to the purposes of that curriculum. And, central to these aims, the supply, development, and retention of high quality teachers must be actively pursued.

Table: 7 Views on the assessment tasks prescribed by CAPS.

The responses of item 7 clearly showed a great divergence about their views about assessment tasks prescribed by CAPS in physical science.22% of the respondents viewed assessment tasks as challenging to prepare and many informal and formal tasks are not marked on time. The researcher's findings indicated that the challenge of assessment has an influence by physical resources such as classroom shortages that lead to overcrowding, availability of laboratories, teaching and learning material and equipment, etc. Teachers concentrated to formative assessment which has the potential to drive changes in teaching that can improve learning drastically. That means teachers failed to mark other activities, they pay an attention those who count in Continuous assessment schedule (CASS). They neglect to do the daily assessment after teaching with the aim of checking or giving a feedback to learners as to their strengths and weaknesses and help to develop strategies to improve their learning.

CAPS emphasize assessment should be continuous, and cover internal and external issues pertinent to intended learning out comes (DoE, 2012). 24% and 10% of the respondents their response is similar, they indicated that to assess learners, they help learners to develop high cognitive levels because of various using different style of assessment after teaching even teachers results to develop the assessment skills. Teachers believed that it is important to consider the informal and formal assessment .44% of the respondents indicated that there is a problem of practical work assessment of learners. The assessment of what has been learned must be closely matched to the

In Table:8 and 10(pg.72) The experience of CAPS during cluster moderation and subject meetings. These tables showed the distribution of responses with percentages. All the respondents indicated that they have the CAPS document.20 % of the respondents indicated that there is not enough time to manage requirements for performance because they submitted the learner portfolio and master portfolio late.8% of the respondents expressed the view that they knew exactly what is expected of them and that the content was clearly defined and they understand the content of the policy. They used the CAPS document as a reference tool for teaching.28% of the respondents encouraged teachers to work hard (in teaching, marking process, assessment and maintaining familiarity with the CAPS document.34% of the respondents said that the moderation process is not genuinely done at school level (not properly done).10% of the respondents complained that there were no qualified teachers for moderation because some teachers are not trained for physical sciences and they taught other subjects.

The respondents indicated in (pg 73) that teachers seldom availed themselves for moderation in the clusters, some have excuses and it is rare to find them available. Teachers were confused to use the physical science guidelines effectively They did not understand the aim of moderation in grade 10 Physical Science. 28% of the respondents said that they encourage teachers to use the guideline effectively.20% of the respondents said that it opens room for sharing ideas with experienced and newly qualified teachers to discuss the challenges in some topics.16% of the respondents said that there was failure with recording marks. 36% of the respondents said that also emphasized that there was no training for new changes in recording the marks in various tasks that are reflected in CAPS and they were dissatisfied with the way the new curriculum was implemented in schools. Teachers indicated that they had not been part of policy developments. Schools did not have resources to implement the new Physical Science curriculum. They found that the time allocated to teaching content topics was not enough as they have difficulty in evaluating learners' performance. Teachers stated that the new curriculum does not provide detail about the content. They also indicated that they have difficulty in arranging the physical classroom environment since classrooms were overcrowded.

15% of the respondents said that CAPS is beneficial in sharing teaching strategies, examination skills to assess learners (e.g. teachers' set common papers –controlled test).

5.3 Table: 9 The views on the value of the CAPS training workshops

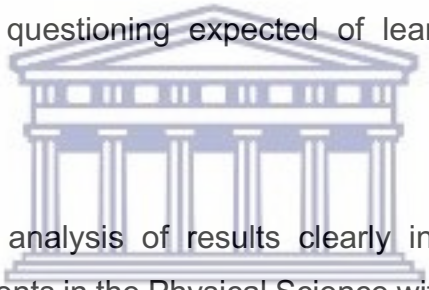
The responses of teachers in Table 9 could be summarized as follows:

The researcher findings indicated that the subject advisor organized the workshops in past years; those workshops were not fruitful because teachers were confused, no practical work training was provided, and they left most questions unanswered. From last year (2016) teachers were very excited to attend the workshops which dealt with theory for two days and experiments for three days. Another workshop was conducted in a confined space the workshop was organized by Eastern Cape Province at East London and the Halls were full. There was a lack of training facilities for teacher's professional development. They gained the knowledge of the physical Science theoretical. The respondents said that time was limited for CAPS training workshops therefore, they were not properly trained for the implementation of CAPS. It was facilitated over a 3-day period only). This left the teachers confused. The managers had a tendency to employ a teacher who achieved best results in Physical Science to conduct a workshop. The newly appointed subject advisor expressed her opinion that depth of knowledge was vital for the successful teaching of Physical Science using CAPS. 46% of the respondents said that no practical workshops were conducted. Workshops on various subjects are conducted at the ERCs in other Districts as per arrangement with the centre management like Cofimvaba.

Table: 11 The researcher's findings are of the opinion that changing of curriculum frustrates teachers because they lack in-depth training and often the planners and trainers are themselves uncertain(Burger, 2010). Teachers complained that the RNCS document was meant to build on the previous curriculum but those changes were to ensure or provide clear specification of what needed to be taught and learnt on a term basis (Erden, 2010:3). There was a general feeling amongst teachers that the DoE introduced new policies without training teachers properly to implement these policies successfully. Those changes resulted in the demotivation of educators and this led to ineffective teaching. They indicated that CAPS consists of a lot of paper work. It is not

easy to give the learners all tasks in the sense that we do the relevant tasks for moderation. The respondents stated that RNCS faced some implementation problems like CAPS. (i.e. working in under-resourced classrooms) There was also an accusation of constantly removing some topics and adding new topics.

Teachers are struggling to cope with the demands of Secondary School Physical Science and thus fail to achieve excellence in the subject. Designing assessment tasks was also an overwhelming battle. Teachers noted that they very often found it difficult to choose a topic within the scope of Physical Science which would be appropriate for Project Work/Investigation. Tirosh and Graeber (2003) suggested that there is a need for developing teachers in terms of how to design activities around the content. Furthermore, there is a need for improving national Physical Science results. However, time for teacher development programmes is insufficient to cover a wide range of content in one day. Workshops that are conducted by departmental officials focus on how to teach the content, not on how to assess the content. This results in teachers focusing more on teaching than assessment and promotes teaching which fails to meet the level of questioning expected of learners who will sit for the examination.



In Tables 12 and 13 The analysis of results clearly indicated that the issue of improvement and achievements in the Physical Science with implementation of CAPS showed that some schools are comfortable to teach effectively and manage to use the constructivism approach. .36% of the respondents indicated that there is not yet an improvement in CAPS because the high failure rate in physical science still exists. 32% of the respondents said that it is difficult to use the CAPS document to ensure that everybody can improve the results (the curriculum has moved away from a teacher-centred approach to a learner- centred approach). The respondents indicated that the use of indigenous knowledge enhanced achievement of the learners in Physical sciences. Teachers encouraged learners to interact with materials to make observations and involve them in hands- on activities. The results of this study revealed that hands-on activity enriched the improvement of learners' achievement in science. The respondents said that teachers apply various teaching styles in the classroom. However, if they were not in position to explain these changes properly, teachers left the workshops confused.46% of the respondents said that the use of different assessment techniques helped to keep the learners occupied.

In table 14 the emerging categories of themes showed the different responses of teachers. All the respondents (100%) commented that CAPS has negatively affected achievement of their learners in Physical Science. For the items1- 13 the findings of my research study indicated the negativity of CAPS in the achievement of learners in Physical Science. The respondents said that no grading of learners is not helpful (learners are doing the same syllabus and are not separated into higher and standard grades). The findings gave the researcher a clear indication that CAPS is not accommodating learners of different needs in the subject matter, although CAPS in the assessment consists the different cognitive levels of questioning according to Bloom taxonomy. Teachers were dependent on the guideline of Physical Science which was drawn from CAPS. Teachers complained that the passing mark of 30% encouraged the learners and teachers to be lazy in their work and undermined the high standards required for University entrance. 50% of the respondents indicated that the emphasis on doing experiment or practical work according to the CAPS was difficult without considering the resources in all schools. Some teachers were not qualified to teach the learning area and that might cause lower achievement of learners in Physical Science. Amongst other things they argued that inadequate training in the use of new technology, failure by DoE to employ sufficient subject advisors and teachers, unrealistic demands of the syllabus and time to cover the work as reasons for this challenge. Teachers were recorded the marks were incorrect to the with the aim of making learners to pass the final schedule etc.). The respondents reported that they tried to encourage learners in practical work activities if they don't have enough equipment in laboratory. They tried to use a free classroom as laboratory. For example, some teachers bought the chemicals with school fees with the aim of assisting their learners in practical work. Teachers need to group learners during the practical investigation to share ideas and to apply indigenous knowledge. For example, teachers believed that some teachers were not qualified to teach the learning area and that might cause lower achievement of learners in Physical Science.

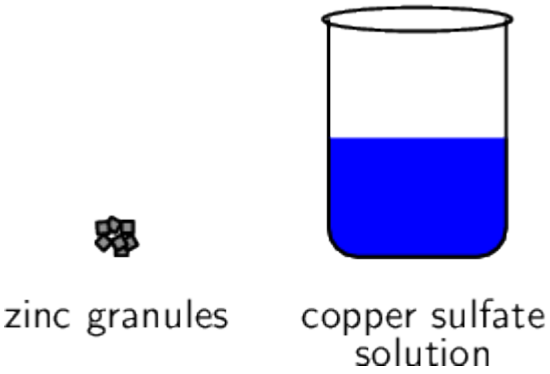
In table 15 the respondents reported that they tried to encourage learners in practical work activities if they don't have enough equipment in laboratory. They tried to use free classroom as laboratory. For example, to conduct the following experiment, a few chemicals and apparatus are needed which the school manager is supposed to allocate to the science budget looking to the needs of the department.

Materials

A few granules of zinc

15 ml copper (II) sulphate solution (blue colour)

glass beaker



The respondents reported different views about motivation: compared to CAPS, they said that 25% of CASS contributed towards learners' progress. This was a clear indication that few teachers ensured that the learners were sensitized about the process and the procedure of CASS. The findings showed that learners were not aware of the fact that they were less in control of their learning but the part of CASS in CAPS motivates learners because learners knew that they had something in their hands without knowing the impact. In the sense that teachers had a tendency of cooking the marks of learners, they gave learners tasks later than the set dates and most of the time learners did them incorrectly.

Teachers indicated that there is a necessity to engage them in extra co–curriculum activities like science clubs, mini quiz, science expo, study tours etc. Teachers need to expose learners in various activities to emphasize the scientific processes which are the in the CAPS document. These findings would play a huge role in the implementation of CAPS to protect the teacher challenges in Physical Science. (See pg.67)

5.5 Step 2

During the Interview schedule, it came out very strongly that most of interviewees agreed that the highly sophisticated CAPS was politically and philosophically a great improvement on the education system of the apartheid government, but the sheer demands it placed on educators was simply too much to cope with. The respondents

5.5.1. How do you experience using CAPS document to teach Physical science?

School Teacher A indicated that the CAPS document clearly outlines the topics and the depth of the knowledge to be done in each grade. Teachers view CAPS as a policy that gives the educator more direction and guidance.

The researcher findings stated that some of the respondents had challenges in implementing the CAPS document because they were not clear. There is a lot of administration work. There was a lack of assistance in planning and instead there was lot of criticism coming from outside.

The respondents have a different view about teaching and learning materials in schools concerning with requirement of CAPS in Physical Science. They supported the fact that the nature of science depends on the way that science knowledge is communicated in textbooks

In stage 1 and 2 the responses are similar in that they said that there was a problem of fewer teaching and learning supportive materials but according to CAPS document each learner must have a textbook. They tried to make photocopies by using school funds. Furthermore, the respondents suggested that DoE should avoid delivering the textbooks late. There were schools that received less money than urban schools and yet those schools have a high number of learners (Brent,2008, Strange et al. ,2012).

The teachers said that CAPS reduces the chances of teaching in ISIXHOSA. It emphasizes the advantage of experienced educators to use English according to the language policies to improve better understanding of lessons taught. Teachers provided supplementary subject matter which increased the enthusiasm for school science to motivate learners. The researcher's findings supported by the study of Bantwini (2010) emphasized that sufficient teacher subject matter was a key to learner's performance. Teachers agreed with the views of lacking experience using CAPS document by indicating certain aspects that need to be considered before implementing CAPS. The shortage of well qualified teachers is reflected in the poor results of science learners. It is not easy to present a lesson plan properly without sufficient knowledge of Physical Science and without sufficient experience in applying CAPS policy.

The findings showed that the poor performance of Physical-science teaching using CAPS was as a result of the fact that some teachers were not qualified to teach science and not capable as teachers because of the poor training they had received as science teachers (Ajaja, 2009). The implementation of outcomes- based education was faced with many problems which prompted a review in 2000, which led to the first curriculum revision i.e. Revised National Curriculum Statement. The implementation challenges continued until the current Minister of Education, Angie Motshekga, decided to form a committee that would work on the revision of the Revised National Curriculum Statement in 2009 (Department of education, 2011:4). The respondents identified that the revision of Revised National Curriculum Statement was that teachers were overloaded, confused, demotivated and under-qualified. .

5.5.2. Has CAPS enhanced achievement of your learners in physical science?

School teacher A: The teacher acknowledged that when practical experiments accompany each topic it makes learning in Physical science very interesting to the learners. They emphasized that the teacher should scaffold content and pedagogy across grade levels in the sense that practical experiments must be connected to the external environment. CAPS encourages teachers to use the community resources to give more clear understanding of content (Bartsch,2008).

School teacher B: the Teacher said that learners fail to pass physical sciences with good levels, "*most of our learners get 30% that is level 2 which drops the numbers of physical science learners with good results in schools. The cause of that is the failure of the practical application of this knowledge in everyday life makes physical science not to be liked by learners".*

The researcher found that teachers were divided into two groups, those trained in colleges and those at Universities. Those teachers who trained at University were less concerned about training workshops and practicals than those with diploma qualifications.

School teacher C: responses indicated that the poor performance of learners in Physical science was very high ever since the CAPS was implemented as compared to the old curriculum.

School teacher D: The teacher showed a positive attitude by referring to his previous results obtained in Physical Science.

5.5.3. What are the factors that affect the teacher's ability to implement CAPS in Grade 10 Physical science?

School teacher A showed that if teachers can conduct experiments, learners are motivated by hands- on activity.

School teacher B: There is a lot of paper work for example, learners write many tasks and some tasks are not marked by teachers. Development for textbooks and other LSTM need to centralize at National level.

School teacher C: He indicated that the teacher's ability in the implementation of Caps is affected by the availability of laboratory mini labs, apparatus and chemicals. School teacher D: this teacher's response matched the responses of teachers A and C. He emphasized the teacher's ability to link classroom teaching to the practical application of concepts in everyday life.

5.5.4. Are you satisfied about the content displayed in the CAPS document? Explain

School teacher A answered this question by showing a positive attitude and explained the importance of certain topics that are done in grades 10-12 displaying continuity of knowledge such as electric circuit, Electromagnetism, electrochemical reaction, etc.

School teacher B indicated that he was not yet satisfied with the content displayed in the CAPS document because some teachers are not well trained in certain topics. Specific topics also need teachers who are trained in tertiary institutions like the University.

School teacher C said that satisfaction about the content is not yet achieved because CAPS just shows the guideline and not the details of how to teach physical science. It indicates the treatment of content and patterns of teacher talk were built into the design of such sequences. Subject allocation and workload were not fair in both teachers and learners in the sense that teachers teach more than one subjects in different phase.

The shortage of well-qualified educators in South Africa in general has contributed to high educator workload in schools, especially in rural schools such as those in the Butterworth District. The lower the number of learners a school has, the higher the workload in terms of subject allocation of educators. One of the challenges educators face in the Butterworth District is what happens when training and development workshops for different subjects are organized and held simultaneously and sometimes at the same venue. In January 2017, the Eastern Cape Province organized subject-specific training workshops for Mathematics and Physical Science, so training

subjects in the same band, Further Education and Training (FET), are forced to choose to attend training in one subject. In most cases, educators choose the subjects that they teach in Grade 12, although two subjects are of equal importance. Lower grades are not taken seriously, although the Grade 12 results depend on the foundation prepared in the lower grades. As a result, educators are deprived of opportunities to broaden their content knowledge level. Regular changes in subject allocation by HODs also affect their content knowledge, as educators may not have received training and development in those subjects. This would eventually disturb learner performance in the implementation of the Curriculum Assessment Policy Statement in Butterworth District.

School teacher D: The respondent showed negative attitudes towards the question based on subject content. No response was elicited.

Teacher knowledge: Subject content knowledge the specific need and demand expressed for additional, better and more appropriate training strengthened our perception that physical sciences teachers lack the necessary subject content knowledge as well as instructional content knowledge. The respondents felt that it was their responsibility to study sections they did not understand (Kriek & Grayson, 2009).

5.5.5. How are learners motivated in CAPS as compared to the old curriculum?

School teacher A: There is no higher grade or standard grade, the content depth is the same for every learner. The learners only differ in different in levels of performance.

School teacher B indicated that learners are interested in CAPS because the learner-centred approach changed their attitude in Physical science by engaging them in hands-on activities.

School teacher C: said that they have support teaching methods to use the various teaching and learning methods in the curriculum. Assessment is as highly influential in the learner's attitudes towards science as the quality of the teaching that they experience.

School teacher D emphasized that CAPS uses the constructivism approach not a traditional approach like the old curriculum. Teachers view CAPS as more focused on the subject matter and helping with guidance for teachers. They also found the document to be instructive.

School teacher A indicated that cluster moderation is of a good standard, but teachers should always be discouraged from doing shadow marking. It was further indicated that there is some change now because of a new Subject advisor and the subject Advisor is well trained. *It is not easy to dodge work as we used to do previously. There are new strategies that are employed in every session.*

School teacher B: *Wow, Cluster moderation is a boring process because some teachers just pass cards, they come late and without bringing tasks.*

School teacher C's response expressed that there is a problem of using formative assessment to improve learners' learning.

School teacher D indicated that teachers fail to attend subject meetings unless the core business of the day is discussion around memorandum for marking the JUNE and TRIAL examination. Teachers that are available in subject meetings are mostly those who are members of subject committees.

5.5.7. Are you satisfied with the pace of the content as outlined in the CAPS document? Explain.

School teacher. A said that she has already alluded to the continuity of topics from grade to grade.

School teacher B said that time allocation for content is a huge problem to many 3+ teachers, in the sense that they struggle to do the revision of work covered.

School teacher Cr indicated that the pace of content as outlined in the CAPS document is not a true reflection in terms of practicality; it requires motivation of teachers to engage themselves in extra time for teaching.

School teacher D showed that there is no dissatisfaction about the pace of content, since the CAPS document emphasizes the importance of conducting practical lessons effectively and to allow learners to do practical work individually or in groups, but teachers are not able to complete the syllabus on time. Even teachers are frustrated with content and learners must cope with the vast content.

5.5.8. What section of the curriculum do you feel is most difficult for you to teach in physical science?

The teachers answered differently which showed that they were not satisfied with content. Some educators indicated the topic of Electromagnetism, more especially,

that science teachers had a tendency of implementing CAPS ineffectively in teaching and they did not appreciate the theory with sections of curriculum because they don't have a clear understanding of chemistry topics and Physics e.g. Redox reaction. Further findings: respondents highlighted that the content is provided as part of teacher education in colleges and not at Universities. In the researcher's opinion, it emphasizes that there was a challenge in workshops for new topics because, unlike other teachers, they had not studied at University. The knowledge becomes too abstract. Respondents showed an attitude with regard to that question. Respondents complained that there is not enough time to expose learners to indigenous knowledge. Shortage of science teachers and science expertise are a reality that exists in many schools. The respondents indicated that curriculum change may impact on the teachers' own background, training and level of confidence in teaching. Another problem is that some teachers who teach science did not major in it, but they do so because of the shortage of science educators. Due to a lack of science background, some teachers choose what they could teach and omit what they could not. Further research needs to be done because the problem seems to be pervasive..

5.5.9. Do you feel that you have sufficient resources to complete the practical experiments as required by CAPS? If not, explain how the lack of resources affects you.

Teacher A indicated that she has only a minilab which has limited equipment and chemicals.

School teacher B: The teacher agreed with schoolteacher A by indicating that a clear understanding about most experiments cannot be given as they needed to improvise or find alternative chemicals to the ones in the worksheet, for example Acids and Bases.

School teacher C: The practical work in his or her school is almost non-existent and they theorize the physical sciences lessons.

School teacher D said that he experiences no problem with resources, the problem is the management of time and there is a shortage of laboratory equipment and laboratories. Teaching concepts that involve practical work is therefore difficult for teachers as they cannot demonstrate certain principles using experiments (Onwu & Stoffel, 2005).

5.5.10. Do you find the training you received for the implementation of the practical components of CAPS is sufficient? Explain.

School teacher A said she did not receive any training about practical work, instead the department organized workshops on theory and teachers do not have a say about it.

School teacher B supported teacher A by saying that the developers of this CAPS document constantly refrain the importance of doing practicals and examine their learners during the assessment time, but not a single demonstration is given on how to do the practicals in workshops.

School teacher D confirmed that they never received any training for practical work. Teacher D also expressed that Practical work is a distinctive feature of Physical Science.

School teacher C answered that even making a complaint to management about the lack of training was not helpful. Instead they say teachers need to involve learners in on-hands activities rather than theorizing the content of conducting the experiment or practical work.

5.6 Conclusion

In this chapter the researcher provided the discussion of the findings with regard to the challenges that are experienced by teachers in the implementation of CAPS in grade 10 Physical-Science. The researcher used the related literature with regards to the findings. Chapter 6 will present the recommendations and conclusions of the research.

CHAPTER 6
CONCLUSION

6.1 Introduction

This chapter provides a summary of the findings from the respondents on perceptions of implementation of CAPS in grade 10 Physical Science teachers. Tacit beliefs and understanding of the situation, feelings, attitudes and values that respondents expressed in the questionnaire and interviews, are highlighted.

6.2 Overview of the study

Chapter 1

This chapter started by briefly presenting the historical background. This was followed by the description of the problem statement and aim of the study. This chapter reflected the previous pass rate of Physical Science in grade 12. A brief literature review was followed by the impact of curriculum changes on teaching and learning in schools. The significance of the study was also discussed and the importance and reasons for the choice of the study were indicated. It concluded with a clarification of the key concepts..

Chapter 2

This chapter dealt with the appropriate literature in a more detailed manner to show the challenges that were experienced by grade 10 physical science teachers, examining various studies from other researchers which align with this study. The chapter began by presenting a detailed discussion on the historical background of changes in curriculum, from the apartheid education system to curriculum and assessment policy statement (CAPS). The literature has also revealed how curriculum change has impacted on teachers' experiences in implementing CAPS in science, from the perspectives of the various stakeholders. The literature focused on the requirements of CAPS mainly on the learner teacher support material, pedagogical strategies and vast subject content which led to the failure of CAPS in improving the matriculation results in Physical Science. The provision of learning and teaching resources and how they influence the implementation of curriculum improvement were discussed. It revealed the theories and approaches behind the teaching and learning of science and why it is important to understand the theory behind Curriculum change in science.

This chapter has provided all the details of the research methodology, research design, population, sampling of the study, research strategy, data collection techniques, their advantages and disadvantages, and the detailed process of data analysis that has been used. Minimization of limitations and potential problems has been addressed by mentioning the approaches that have been used to limit potential criticism as this is a case study and pilot study. The researcher used the qualitative research method, both in collecting and analyzing the data. Random sampling was used to take 50 grade 10 physical science teachers from which four respondents were selected. Simple random sampling was used to select the four teachers. The researcher used two instruments, an open –ended questionnaire for stage 1 and interview schedule for stage two, and the process was videotaped. The interviews to address the problem stated in chapter one. To provide a baseline for future studies, literature should be included. Data was tabulated in tables and figures drawing by Excel.

Chapter 4

This chapter reports on the results obtained and is organized around the data collected in order to answer the research question:. How teachers can improve effective learner understanding in the implementation of CAPS in grade 10 Physical Science.

This chapter has highlighted the fact that challenges surrounding curriculum implementation of CAPS in grade 10 Physical Science are affecting most teachers in and around the Butterworth District. According to research findings, lack of resources, insufficient training, unavailability of laboratory equipment and poor management planning results in the failure of CAPS. The researcher has highlighted the problems surrounding this new policy change as these problems have always haunted the implementation of various curriculum policies in education in South Africa. The responses of the teachers were transcribed and an analysis of each question analysis was made. Those questions were asked during the first stage of the research study in order to stimulate the teachers' existing knowledge about the update of curriculum changes.

The second stage of the research study endeavored to broaden the enquiry with textual analysis of CAPS to obtain more clarity data about the challenges in teaching and learning science.

Chapter Five analysed the research findings (chapter 4) on perceptions of teachers towards the implementation of CAPS. According to the reviewed literature in this chapter, it seems as if the impact of curriculum change in science is a serious problem that needs urgent consideration. This chapter offers a summary and conclusion, and suggestions for the research study. It also scrutinizes the implications of such findings for effective teaching in the implementation of CAPS in science.

6.3 **Major findings**

6.3.1 Insufficient Training of teachers

Teachers stated their need for proper and suitable training by professionals and experts in order to deal with the content and approaches of teaching. The addition of new content in the syllabus such as electromagnetic radiation and redox reaction were viewed as problematical since most teachers did not receive formal training in the new topics.

Teachers complained about lack of effective training even in using the practical resources which are sent by the Department of Education (DoE). The respondents blamed the DoE for providing the science kits without any instruction as to how to use the material. Some schools received more science kits than other schools, more especially in rural areas. The respondents emphasized that there was a need for training in practical work. Teachers indicated that it was not easy to draft or design the worksheets for the experiments and projects.

6.3.2 Understanding of the policy document

After intervention, educators understood what was entailed in the policy document and they revealed that they used it during lesson planning and presentation. Learner understanding improved and performance became better.

6.3.3 Content gap

The content was understood by educators after being trained in how to use the CAPS document and the content gap was bridged. Educators stated that they were teaching the content that was not examinable as they were following the CAPS document. After proper interaction with the document the content became simpler to implement. .

6.3.4 Use of practical work

When practical work was infused with theory during teaching, the performance of learners improved and the teachers' confidence also improved.

6.3.5 Assessment and examination

The questions were set as per Blooms Taxonomy to satisfy the differing needs of the learners, incorporating theory and practical work in both formal and informal assessments as well as controlled examinations.

6.3.6 Lack of resources

Most schools did not have sufficient resources for practical work or well-resourced laboratories, which made it difficult to teach Physical Sciences content comprehensively.

6.3.7 Poor management

Poor management and lack of supervision by SMTs and school Heads were the main causes of poor implementation of CAPS because they taught lessons as they pleased. The results revealed that educators were not properly managed when teaching and there were no class visits of any kind. The tests that were written were not moderated at school level.

6.3.8 Infrastructure

Most schools do not have infrastructure suitable for CAPS implementation especially in rural schools. The available classrooms are overcrowded and do not cater for individual learner attention.

The results of this study align with the research findings from other scholars, which indicated that participants received little training when a curriculum was introduced (Moalosi & Molwane, 2010: 33). Participants expressed the view that the training they received was inadequate for them to implement the curriculum effectively.

6.4 Summary of the findings

The researcher's findings were based on the questionnaire to fifty (50) teachers and the interview with 4 teachers selected from fifty teachers. These findings leave room for further research as some of the challenges might not be fully covered by this research. The researcher deals with this aspect later in the chapter.

According to the findings in this research, teachers were experiencing challenges with implementing the CAPS in teaching Grade 10 Physical Sciences. They showed little background on how to implement CAPS and how CAPS benefited them. There were indications in the findings that some teachers required more time and effort to be able to complete all the requirements of CAPS. Other teachers showed that CAPS was problematic because of lack of resources and even though some of those schools were in the urban areas, they experienced similar challenges to those in the rural areas.

Other findings showed that teachers were partly responsible in demoralising learners in the sense that they only focused on the portfolios that were chosen for moderation since only ten percent is required for moderation. Teachers ensured that the syllabus was timeously covered in order to satisfy the officials without thinking about the content understanding of learners. Teachers were dissatisfied with the status quo and perceived the demands of the new policy as challenging.

Some teachers adopted a more passive role regarding CAPS interpretation and implementation while others adopted a more critical stance in interpreting policy requirements and demonstrating a more proactive approach in its implementation. If teachers were not trained in how to implement CAPS in Physical Science, then its implementation was bound to be problematic. Furthermore, in order for CAPS to be implemented effectively, teachers needed to commit themselves to using the learner –centred approach and spend more time and effort in the implementation of the findings. Findings showed that teachers needed adequate training in CAPS, they lacked the understanding of CAPS and that might lead to more challenges between policy and practice.

6.5 Recommendations

- Understanding the CAPS document

of Curriculum and Assessment Policy Statement (CAPS) in the future. Teachers should always aim to improve their understanding of CAPS and the subject matter so that they would be able to apply their knowledge to real life situations. Teachers should be cooperative and willing to do their work properly.

- Pedagogical strategies

Teachers are encouraged to use the learner- centred approach in the learning and teaching situation. The teacher's and learner's portfolio should be available at all times to serve as evidence of assessment tasks that they have completed for the whole year. The advantage of compiling and keeping these portfolios is that it gives learners and teachers the assessment record that can help in the preparation for feedback.

Therefore, they should always make sure that teaching includes the practical work, some control over the assessment tasks and the coverage of the syllabus. This would help learners to monitor their progress and see how they could improve in performance in future tasks.

- In service –training of teachers

Teachers, on the other hand, need more time and professional training in how to implement CAPS in Physical Science so that these challenges could be avoided. It is suggested that more time for training should be provided to teachers so that they can clearly understand the content, assessment procedures, strategies for teaching and learning before the term starts. It would place teachers in a better position to improve the quality of their interaction with the learners in the classroom. In-service training of teachers is important and this should be an on-going process. Regarding the quality of training, responses received from teachers reveal that teachers have different perceptions about the training they received. The findings further suggest that workshops should be conducted before the implementation of CAPS.

6.6 Implication of this study

The following are regarded as contributions to this study:

The successful implementation of CAPS depends on many requirements. The study has managed to highlight the challenges that may inhibit the teaching of Physical Science. These have been seen in the model adapted from the previous curriculum.

understand the challenges with the implementation of CAPS in grade 10 Physical Science. This study has helped teachers to understand the requirements of dealing with CAPS so that Physical Science can be taught effectively. This study gives teachers courage with regard to how to deal with learners so that they receive good quality education. The significance of this study is to ensure that all the stakeholders take responsibility or learners' education. It also positions teachers on the right track that will ensure that they produce good results in Physical Sciences and that would change the standard of education in all schools. Teachers would become motivated to teach Physical Science effectively because of a clear understanding of CAPS documents aligned with the Physical Science guidelines. This study encourages teachers and Curriculum advisors to develop their qualifications in order to fill the gap of content, improve assessment techniques and practical investigation.

Science educators and the Science community could benefit greatly from this study. After doing this research, the community could show responsibility in protecting the resources within the school. They may contribute to providing desks for learners. Science teachers could improvise and make apparatus or equipment to conduct the experiments. Other teachers could have an interest in improving their qualifications, , since the researcher indicated that she was one of the students at the University of the Western Cape. There would be an improvement in Physical Science results.

The amendments in education by the government in South Africa since 1994 have brought about a series of changes to the National Education Curriculum. From the Nated 550 to the current CAPS changes in education, new tactics, syllabi and assessment guidelines have had to be effected.

Although these changes have been an improvement in the previous curricula, the implementation of the current CAPS curriculum is still problematic. This study has highlighted a specific area of Physical Sciences in Grade 10 in respect of the use of practical work as a teaching tool and as an assessment instrument.

This study has revealed that schools in the sample encountered problems with regard to the implementation of CAPS. The issues that contribute to the poor implementation of CAPS indicated that practical work in the Physical Sciences classroom was exacerbated by the lack of laboratory equipment, an inadequate amount of time that is required to prepare and conduct practical work, and the large class sizes.

The Department of Education will need to direct more financial and human resources towards improving the conditions at schools so that CAPS can be implemented effectively. This will in turn help to produce learners who will be able to enrol at higher education institutions and meet the requirement of various fields like engineering, science teachers and other professions vital to the development of the economy, locally and internationally.

The significance of the current study still stands out as far as the findings in this study are concerned. The researcher has seen a reflection of reality in the context of the participants' schools and may suggest that the situation in similar even in other schools. The study provides curriculum designers with an overview of what to do in helping teachers to do practical work meaningfully and to also consider the time prescribed for teaching the content, including the assessment part in learning.

- The findings provide the school management team (SMT) with a better vision of the challenges that Physical Sciences teachers encounter when implementing CAPS in their schools. The findings of this study promote the necessary management of resources to be used by teachers and learners and the SMT should monitor the resources at their disposal.
- After a consideration of these findings, the subject advisors will be able to improve on the shortcomings of the CAPS training attended by the teachers.
- The findings will make the District Representatives aware of the absence of resources in schools for them to be more positive in facilitating the provisions of resources to under-resourced schools and equitably deliver the resources more especially in rural areas. Above all, the findings in this study will provide advice to policy makers on the implementation of CAPS and also to the users such as teachers, learners, parents, subject advisors and other relevant users.

The aim of developing the two instruments (open-ended questionnaire and interview schedule) in this study was to uncover more information about the challenges that are faced by teachers in the implementation of CAPS in grade 10 Physical Science. These two instruments suit the qualitative approach. The respondents fully expressed their ideas and feelings concerning the research project.

6.7 Limitations of this study

The following limitations of the study are indicated in order to direct future studies. More research is still needed on the subject. The study was done in only one district out of 23 districts of the Eastern Cape, which is the Butterworth District. The researcher began this study two years ago. The districts in the Eastern Cape are now minimized to 12 districts. The researcher focused on Secondary school teachers only. The research adopted only the qualitative method. The researcher did not mention the quantitative method but for future purposes the quantitative method is also required to offer further statistical evidence. Fortunately, the sample size is a mixture of schools with small and large numbers of learners. Only one educator from the different schools was used even if the school had more than one Grade 10 Science teacher who could have been used to implement the same instruments. The Pilot test was used only on a small scale; a larger scale could be used to check the validity and reliability of questions. The language efficiency of teachers in a specific area could also be submitted. The study was conducted in English and teachers were expected to respond and cooperate in all questions in English. Some of teachers did not respond in English only, they mixed it with IsiXhosa because, as the researcher, I accepted that issue as English is not our mother tongue and the researcher respects the Constitution of South Africa (1996). This could be a limiting factor; using at least two languages might have an effect on the results gathered in the study. Moreover, the limitations of the study show how the researcher chose to pick Grade 10 Physical Science teachers' challenges of implementing CAPS and looked at their effect in teaching and learning Science in Butterworth schools.

6.8 **Conclusion**

During the investigation of teachers' challenges in curriculum implementation of CAPS in Grade 10 Physical Sciences, issues that hamper their curriculum implementation were investigated. This study highlighted the basic training that the teachers received, the lack of curriculum interpretation, inadequate resources, poor infrastructure and overcrowding. From the research findings, the lack of training and insufficient resources affected teachers' knowledge and understanding of curriculum principles, pedagogical strategies, and assessment, in that some teachers were unable to meet the requirements of curriculum implementation.

REFERENCE LIST

Abd-El-Khalick, F., & Lederman, N. G. (2000). Improving science teachers' conceptions of nature of science: a critical review of the literature. *International Journal of Science Education*, *22*(7), 665-701.

Abrahams, I. & Saglam, M. (2010). A study of Teachers' Views on Practical Work in Secondary Schools in England and Wales. *International Journal of Science Education, 32* (6), 753 – 768.

Ajaja, .O.P. (2009). Evaluation of Science Teaching in Secondary Schools in Delta State 2 –*Teaching of the Sciences*, *1*(2), 119-129.

Alters, B. (1997). 'Whose Nature of Science? *'Journal of Research in Science Teaching, 34:39-56.*

Apple, M. (1979). *Michael Apple on Ideology in Curriculum*. Retrieved 2018, from http://newlearningonline.com/new-learning/chapter-8/michael-apple-on-ideology-in-curriculum

Babbie, E., & Mouton, J. (2001). *The Practice of Social Research*. Cape Town: Oxford. 70(1), 2-14.

Baez, B. (2002). *Confidentiality in qualitative research: reflections on secrets, power and agency*. Qualitative Research, 2(1), pp.35-58.

Bantwini, D.B. (2009). District professional development models as a way to introduce primary school teachers to natural science curriculum reforms in one district in South Africa. *Journal of Education for Teaching*, *35* (2): 169-182.

Bernstein, Basil B (1996). *Pedagogy, symbolic control and Identity: theory research, critique*. Taylor & Francis, London: Washington, D.C.

Biggam, J. (2011). *Succeeding with your master's dissertation: A step-by-step* handbook. McGraw-Hill International [UK] Limited.

Biggs, J. B. (1996). Assessing Learning Quality: reconciling institutional, staff and educational demands. *Assessment & Evaluation in higher Education, 21*(1):5-15

Bless, C. & Higson-Smith, C. (2000). *Fundamentals of social research methods* (3rd Edition). *An African perspective*. Cape Town: Juta.

Brooks, J. G., & Brooks, M. G. (1993). In search of understanding: The case for constructivist classrooms. *Alexandria, VA: Association for Supervision and Curriculum Development. 70*(1), 1-15.

Bryman, A. (2004) *Social Research Methods*. (2nd Edition). Oxford: Oxford University Press.

Burn and Grove (2019). [online] Shodhganga.inflibnet.ac.in. Available at: http://shodhganga.inflibnet.ac.in/jspui/bitstream/10603/135441/9/09_chapter%203.pdf [Accessed 14 Jan. 2018].CA: Sage.

Campbell, B., Lubben, F., & Dlamini, Z. (2000). Learning science through contexts: Helping pupils make sense of everyday situations*. International Journal of Science Education, 22* (3) 239-52.

Chang, K. (2009, November 23). *White House begins campaign to promote science and math education*. The New York Times. Retrieved from: stem for Regression, (3rd Edition). Cary, NC: SAS Institute.

Chiappetta, E., Koballa, T. & Collette, A. (1998). *Science Instruction in the middle and secondary schools* (4th edition). New York: Merrill Publishing.

Chigona,A., and Chetty, R. (2008). Teen mothers and schooling: lacunae and challenges.. *South African Journal of Education, Vol28:2*61-281

Chisholm, L. (2005). The politics of curriculum review and revision in South Africa in regional context. *Human Science Research Council of South Africa, 35* (1): 79-100.

Chislom, L. (2005). The making of South Africa's National Curriculum Statement. *Journal of Curriculum Studies, 37*(2), 193-208. Retrieved 2018.

Chokwe,M.J.,(2011), Academic writing in English second language contexts: Perceptions and experiences of First year students and Tutors', *MA thesis, University of South Africa.*

Christie, P. (1999). OBE and Unfolding Policy Trajectories: Lessons to be Learned*. In Jansen, J. and Christie, P (eds.) Changing Curriculum. Studies on Outcomes-based Education in South Africa*. (pp279-292) .Cape Town: Juta & Co. Ltd.

Cohen, L., Manion, L. & Morrison, K. (2002). *Research methods in education* (6th Edition). London: Routledge.

Creswell, J. (2009). *Research Design: Qualitative, Quantitative and Mixed Methods Approaches*. Los Angeles: Sage.

Da Chang, K. (2009, 11 23). Retrieved 7 3, 2014, from www.amazon.com/science

Dahms NM, Olson LJ, Kim JJ. (2008). Strategies for carbohydrate recognition by the mannose 6-phosphate receptors. *Glycobiology, 18*(9):664-678.

David Baker & Peter C. S. Taylor (1995) The effect of culture on the learning of science in non-western countries: the results of an integrated research review. *International Journal of Science Education*, 17:6,695-704, DOI: 10.1080/0950069950170602

Dawson, C. (2007) *A Practical Guide to Research Methods, A User Friendly Manual for Mastering Research Techniques and Projects* (3rd Edition). How to Books Ltd., Oxfordshire.

De Vos, A.S. (2002b). *Qualitative data analysis and interpretation*. In De Vos, A.S.(Ed.), Strydom, H., Fouché, C.B. & Delport, C.S.L. (2nd ed). Research at gras roots for the social sciences and human service professions. Pretoria: VanSchaik Publishers.

Delport, C.S.L. & Fouché, C.B. (2011). *Mixed methods research*. In De Vos A.S.,Strydom, H., Fouché C.B. & Delport C.S.L. Research at the grass roots for the social sciences and human service professions. (4th ed). Pretoria: JL Van Schaik

Denzin, N. and Lincoln, Y. (1998). *The SAGE handbook of qualitative research*. Thousand Oaks: Sage Publications.

Department of Basic Education (2011). *Curriculum and Assessment Policy Statement.* Department of Basic Education, Pretoria.

Department of Basic Education (DoBE) (2011). *Curriculum News. Improving the quality of learning and teaching. Strengthening curriculum implementation from 2010 and beyond effective.* Pretoria, South Africa.

Dirkx, J.(1997) "Nurturing Soul in Adult Leaming." Adult Education Quarterly, 74, 79-87.

Diseko, R., & Modiba, W.(2014) learners'and their teacher's experiences of an authentic online assessment test in the understanding of basic accounting content knowledge. *International E-Journal of Advances in Education*, *2*(6), 345-356.

DoBE. (2011).*Curriculum and Assessment Policy Statement (CAPS) Physical Sciences, 2011*. Department of Basic Education, Pretoria.

Driscoll, M. (1989). Essentials of learning for instruction. *Englewood Cliffs, N.J. Prentice Hall, 82*(1), 1-13.

Erden,E. (2010).*Problems that preschool teachers face in the curriculumimplementation*.Dissertation-M.Ed. Middle East: Middle East Technical University.

improvement of early-grade mathematics: New evidence from the Gauteng Primary Language and Mathematics Strategy. *International Journal of Educational Development*, *49*:157-174.

Flick, U. (2009). *An introduction to qualitative research* (4th ed.). Thousand Oaks, CA, : Sage Publications Ltd.

Fontana, Andrea and James Frey. (1994).The Art of Science." Pp. 361-376 in *The Handbook of Qualitative Research*, edited by N. a. Y. L. Denzin. Thousand Oaks: Sage

Fraser, B. (1981). TORSA: Test of science-related attitudes. *Victoria: Hawthorn. 2*(5), 7-13.

Freund, R., & Littel, R. (2000). SAS System for Regression. Cary NC: SAS Institute.

Frey, J. H. (1994). Interviewing: The art of science. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research*. Thousand Oaks, CA: Sage.

Gabela, R. V. (2005). *Rural and peri-urban schools in South Africa*. Paper presented at the education workshop held at Chicago States University, USA, 25 – 28 April 2005.

Gao, L. B. (1998). Cultural context of school science teaching and learning in the People's Republic of China. *Science Education*, *82*(1), 1-13.

Garrett, B., & Locklear, E. (2007). 4-H Science, Engineering, & Technology (SET). National 4-H Headquarters. Washington, D.C.: United States Department of Agriculture, Cooperative State Research, Education, and Extension Service.

Gay, L. and Gay, L. (1992). *Student study guide to accompany Educational Research*. New York: Merrill.

Gibson, H. L., & Chase, C. (2002). Longitudinal impact of an inquiry-based science program on middle school students' attitudes toward science. *Science Education, 86*(5), 693-705.

Gibson, H., & Chase, C. (2002). Longitudinal Impact of an Inquiry-based Science Program on Middle School Students Attitudes Towards Science. *Journal Science Education, 86*(5), 693-705.

Gill, PW., Stewart, KF., Treasure, E., & Chadwick, B. (2008). *Methods of data collection in qualitative research*: Interviews and focus groups. *British Dental Journal, 204*:291 - 295. https://doi.org/10.1038/bdj.2008.192

convention in vector-kinematics: A phenomenographic perspective. *African Journal of Research in Mathematics, Science and Technology Education*, *11*(1): 61-73.

Grant, M. and Hallman, K. (2006): "Pregnancy-related school dropout and prior school performance in South Africa," *Policy Research Division Working Paper no. 212*. New York: Population Council.

Habermas, J. (1984). Theory of Communicative Action. *Vol. 1: Reason und the Rationalization* of society. (T. McCarthy, trans.). Boston: Beacon Press.

Halim, C. T., Rahman, J. L., & Abdullah, M. (2010). Elementary teachers' use of formative assessment to support students' learning about interactions between the hydrosphere and geosphere. *Journal of Geoscience Education, 63*(3), 210-221.

Hattie, J., & Timperley, H. (2007). The Power of Feedback. *Review of Educational Research, 77(*1), 81–112. https://doi.org/10.3102/003465430298487

Hoadley, U. (2012). What do we know about teaching and learning in South African primary schools? *Education as Change 16*(2), 187–202.

Hofstein, A. & Lunetta, V. N. (1982). *The role of the laboratory in science teaching: Neglected aspects of research. Review of Educational Research, 52:*201-217.

Hollway, W. and Jefferson, T. (2013). *Doing qualitative research differently*. London: SAGE.

Horkheimer. M.H., (1982). *Critical Theory*. Retrieved 2018, from https://plato.stanford.edu/entries/critical-theory/

Howie, S. (1997). Mathematics and Science Performance in the Middle School Years In South Africa: A summary report on the performance of the South African Pupils In The Third International Mathematics and Science Study. Pretoria: HSRC.

Hulett, L. D., Williams, T. L., Twitty, L. L., & Turner, R. C. (2004). Inquiry-based classrooms and middle school student perceptions about science and math. *Paper presented at the 2004 Annual Meeting of the American Educational Research Association*, *5*(8), 66-75. San Diego, CA.

Hullet, L., Williams, T., Witty, L., & Turner, R. (2004). Inquiry-based classrooms and middle school children perceptions about science and maths. San Diego, CA: *Annual Meeting of the American Educational Research Association. In N. Taylor, S. Van der Berg, & T. Mabogoane, What makes schools?*

studies in large scale education reform. *Country Studies Education Reform and Man Publication Series, II* (1): 1-61.

Jansen, J. D. & Taylor, N. (2003). Educational Change in South Africa 1994-2003: *Case Studies in Large-Scale Education Reform.*

Jansen, J., & Tyler, N. (2003). *Educational Change in South Africa 1994-2003: Case Studies in Large-Scale Education Reform. Country Studies Education Reform and Management Publication Series, 2(1).* Retrieved 2018, from https://www.jet.org.za/resources/Jansen and Taylor_World Bank report.pdf.

Johnson, B., & Christensen, L. (2008). Educational research: *Quantitative, qualitative, and mixed approaches* (p. 34). Thousand Oaks, CA: Sage Publications.

Johnson, R & Christensen, Larry. (2014). *Educational Research Quantitative, Qualitative, and Mixed Approaches* (Fifth Edition). 4(3), 73-88

Johnson, R., Onwuegbuzie, A. and Turner, L. (2007). Toward a Definition of Mixed Methods Research. *Journal of Mixed Methods Research*, *1*(2), pp.112-133.

Kalpana P (2014). A constructivist perspective on teaching and learning: A conceptual framework. *International Research Journal of Social Sciences, 3*(1):27-29.

Kellner, D. (2003). *Toward a Critical Theory of Education*. Retrieved 2018, fromhttps://pages.gseis.ucla.edu/faculty/kellner/essays/towardcriticaltheoryofed.pdf

Kerachsky, S. (2008). Highlights from TIMSS 2007: *Mathematics and science achievement of U.S. fourth- and eighth-grade students in an international context*. Washington, D.C.: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

Kress, C. A., McClanahan, K., & Zaniewski, J. (2008). *Revisiting how the U.S. engages young minds in science engineering and technology*: A response to the recommendations contained in The National Academies' "Rising Above the Gathering Storm" report.

Kress, C., McClanahan, K., & Zaniewski, J. (2008). Revisiting How the U.S. Engages Young Minds In Science, Engineering and Technology: A Response To The Recommendations Contained In The Natioanla Academy. New York: Rising above the Gathering Storm.

Kriek, J. and D. Grayson, (2009). A holistic professional development model for South African physical science teachers. *South African J. Educ., 29*: 185-203.

South African physical science teachers. [online] Sajournalofeducation.co.za. Available at: http://www.sajournalofeducation.co.za/index.php/saje/article/viewFile/123Jeanne/149 [Accessed 2018]

Kriek, J., & Basson, I. (2009). Implementation of the new FET Physical Science Curriculum: Teachers views. ISTE and 2 Dept of Physics, University of South Africa. Retrieved 2018, from http://uir.unisa.ac.za/bitstream/handle/10500/13496/final%20paperSP_kriekbasson%282008%29%20%282%29.pdf?sequence=1&isAllowed=y

Krueger, R. and Casey, M. (2009) Focus Groups: *A Practical Guide for Applied Research*. Sage Publications, Thousand Oaks, CA.London: SAGE Publications

Labaree. R. V. (2009). *Organizing Your Social Sciences Research Paper: Theoretical Framework*. Retrieved 2018, from http://libguides.usc.edu/writingguide/theoreticalframework

Lazarowitz, R., & Tamir, P. (1994*). Handbook Of Research On Science Teaching and Learning*. (D. Gabel, Ed.) New York: MacMillan.

Lekgoathi, S. P. (2010). The History Workshop, Teacher Development and Outcomes-Based Education over the Past Seven Years1. *African Studies*, 69(1), 103-123. doi:10.1080/00020181003647223

MacMillan, S. (2009). *Qualitative Research In Education: A Conceptual Introduction*. New York: Longman.

Mahlong, A. (2010, April 14). R35m more for struggling Dinaledi schools. Pretoria, Gauteng, South Africa.

Mahy M & Gupta N (2002). *Trends and differentials in adolescent reproductive behaviour in sub-Saharan Africa.* DHS Analytical Studies No.3 Calverton, MD: ORC Macro International.

Makeleni, T. N. (2013). *The experiences of Foundation Phase teachers in implementing the curriculum (Doctoral dissertation)*.

Markowitz, D. G. (2004). Evaluation of the long-term impact of a university high school summer science program on students' interest and perceived abilities in science. *Journal of Science Education and Technology, 13*(3), 395-407.

Marshall, C., & Rossman, G. B. (2011). *Designing qualitative research* (5th ed.). Thousand Oaks

Marton, F. (2005). *On some necessary conditions of learning. Journal of the Learning Sciences, 15*:193–220.

Understanding. New York: Harper Collins.

McMillan, J. H., & Schumacher, S. (2001). *Research in Education. A Conceptual Introduction. San Francisco, CA: John Wiley & Sons.*

McMillan, J.H. & Schumacher, S. (2006). *Research in Education: Evidence-Based Inquiry* (6th Edition). Boston: Pearson. 107

Mda, T. & Mothata, S. (eds.) (2000) *Critical issues in South African education after 1994*. Kenwyn: Juta.

Mere. E., Kwayisi. E. M. (2009). Guiding students to develop an understanding of scientific inquiry: A science skills approach to instruction and assessment. *CBE—Life Sciences Education, 13*(1), 90-101.

Merriam, S. B. (2009*). Qualitative Research: A Guide to Design and Implementation* (2nd Edition). Jossey- Bass, San Francisco.

Merriam, S. B. (2009*). Qualitative research: A guide to design and implementation*. San Francisco, CA: John Wiley & Sons.

Meyer L. Epilogue. In L Meyer, BJJ Lombard, P Warnich & CC Wolhuter (eds). (2010). *Outcomes-Based Assessment for South African Teachers*. Pretoria: Van Schaik Publishers

Meyer, R. E., & Fouts, J. (1992). A cluster analysis of high school science classroom environments and attitudes towards science. *Journal of Research in Science Teaching, 29*(1), 929-938.

Mhaule, R. (2011). *Speech delivered by Mpumalanga Department of Education, MEC Reginah Mhaule at the occasion of awards ceremony held at Suikerland Secondary School. | South African Government*. [online] Gov.za. Available at: https://www.gov.za/speech-delivered-mpumalanga-department-education-mec-reginah-mhaule-occasion-awards-ceremony-held [Accessed 2018]

Miller, J. (2006, May). Civic scientific literacy in Europe and the United States. *Paper presented at the annual conference of the World Association for Public Opinion Research, Montreal, Canada.*

Mokgato, M. and Mji, A. (2006). Factors associated with high school learners' poor performance: a spotlight on mathematics and physical science. *South African Journal of Education, 26* (2):253-266.

Ngware, M., Abuya, B., Mutisya, M. & Oketch, M. (2010). Classroom Observation Study: *A Report on the Quality Teaching and Learning in Primary Schools in Kenya.* Nairobi: APHR

Nilsson, P. (2008). Education for All: teacher demand and supply in Africa. *Education International Working Papers*, *Vol12*.

Ogunniyi, M. B. (1988). Adapting Western Science to Traditional African Culture. *International Journal of Science Education, 10*(1): 1-9.

O'Leary, Z. (n.d.). *The essential guide to doing your research project*. *2*(9), 90-96

Olivier, W.A., (2013). Reflection on the training of teachers for the CAPS Publishing Company, (2004). Inc.

Onwu, G. & Stoffel, N. (2005) Instructional functions in large, under-resourced science classes: *Perspectives of South African teachers.Perspectives in Education*, *23*(3): 65-75.

Opie, C.(2004). *Doing Education Research: A guide to first time Researchers.* London:Sage.

Oppenheim, A.N. (1992) *Questionnaire design, interviewing and attitude measurement*. London: Pinter Publishers.

Pandor, N. (2004). 2004 matric results. *South African Government Information*. Retrieved May 15, 2018 from www.info.gov.za/speeches/2004

Pinnock, A.J.E. (2011). *A practical guide to implementing CAPS: a toolkit for teachers, schools managers and education officials to use to assist in managing the implementation of a new curriculum*. NAPTOSA

Rahm, J. (1999*).* Is that really science? A look at the science practice of an inner-city youth gardening program. *Paper presented at the Annual Meeting of the American Educational Research Association*. Montreal, Quebec, Canada, April 19-23.

Rudner, L. M., & Schafer, W. D. (Eds.). (2002). *What teachers need to know about assessment*. Washington, DC: National Education Association.

Rule, P. and John, V. (2011). *Your guide to case study research*. Pretoria: Van Schaik.Sage Publications. *2*(9), 90-96

Saldana, J. (2009). *The coding manual for qualitative researchers*. Los Angeles, CA: SAGE.

Seale, C., Gobo, G., Gubrium, J. F., & Silverman, D. (2004). *Qualitative Research Practice*.

Shabani, K., Khatib, M., & Ebadi, S. (2010). Vygotsky's Zone of Proximal Development: Instructional implications and teachers' professional development. *English Language Teaching, 3* (4): 237-248.

Shalem, Y. D. (2014). *The challenges of realising inclusive education in South Africa*. Retrieved 2018, from http://www.scielo.org.za/scielo.php?script=sci_arttext&pid=S0256-01002014000200003

Sibanda, I. (2016). An investigation into the factors associated with high school learners' poor performance in physical science in the Libode District in the Eastern Cape (Doctoral dissertation).

Silverman, D. (2004). *Qualitative Research. Theory, Method and Practice* (2nd ed.). London. John Wiley & Sons.

Silverstein, S. (2002). The Effects of Teacher Participation in A Scientific Work Experience Program On Student Attitudes and Achievements: A Collaborative Multi-Site Study. *National Science Foundation*. New York: Columbia University.

Silverstein, S. C. (2002). The effects of teacher participation in a scientific work experience program on student attitudes and achievement: A collaborative multi-site S study. *Final Report to the National Science Foundation*. New York: Columbia University.

Skosana, P. S., & Monyai, R. B. (2013). The Teacher as a Catalytic Agent in the Implementation of the Curriculum. International Journal of Humanities and Social Science Invention, 2(9), 90-96. Retrieved 2018, from https://pdfs.semanticscholar.org/9436/5af642142da2945fe683be90ceb1709c9c10.pdf

Spaull, N. (2013). *South Africa's Education Crisis: The quality of education in South Africa*. [online] Pdfs.semanticscholar.org. Available at: https://pdfs.semanticscholar.org/8284/240c243cbd0172ee1451486af141f3fd2e09.pdf [Accessed May 2017].

Stake, J. E., & Mares, K. R. (2001). Science enrichment programs for gifted high school girls and boys: Predictors of program impact on science confidence and motivation. *Journal of Research in Science Teaching, 38*(10), 1065-1088.

Stake, J., & Mares, K. (2001). Science Enrichment Program For Gifted High School Girls And Boys: Predictors of Program Impact On Science Confidence and Motivation. *Journal of Research In Science Teaching, 38*(10), 1065-1088.

Stake, R. E. (1967). The countenance of educational evaluation. *Teachers College Record, 68*(7), 523-540.

Stemler, StevenE. (2004). A comparison of consensus, consistency and measurement approaches to estimating interrater reliability. *Practical Assessment, Research &Evaluation, 9*(4). Available online: http://PAREonline.net/getvn.asp?v=9&n=4.

Streubert, H. and Carpenter, D. (1994). *Qualitative research in nursing*. Philadelphia: J.B. Lippincott.

Suskie, L. (2004). *Assessing student learning: A common sense guide*. Bolton (2nd Edition). MA: Anker

Sutherland, D. & Dennick, R. (2002). Exploring culture, language and the perception of the nature of science. *International Journal of Science Education*. *24*(1), 1-25.

Tashakkori, A. & Teddlie, C. (2003). *Handbook of Mixed Methods in Social & Behavioral Research*. Thousand Oaks: Sage

Taylor, N & S Taylor. (2013). Teacher knowledge and professional habitus. In N Taylor, S van der Berg & T Mabogoane (eds.) *Creating effective schools*. Cape Town: Pearson Education, pp. 201-232.

Taylor, N., Muller, J. and Vinjevold, P. (2003). Getting schools working: research and systemic school reform in South Africa. Cape Town: Maskew Miller Longman/Pearson. *Education South Africa.*

Themane, J. M., & Mamabolo, M. J. (2011). *DIVERSITY AS A CURRICULAR CHALLENGE IN SOUTH AFRICAN SCHOOLS*. Retrieved 2018, from http://www.saqa.org.za/docs/promo/2011/themane.pdf

Thomas, R. (2011). *Blending qualitative & quantitative research methods in theses and dissertations*. Thousand Oaks, Calif.: SAGE [distributor].

Tirosh,D.,&Graeber,A. (2003). *Challenging and changing mathematics classroom practices*. In A.J. Bishop,M.A. Clements, D. Brunei, C. Keitel, J. Kilpatrick, & F.K.S. Leung (Eds.) *The second international handbook of mathematics education (pp. 643-687). Dordrecht, The Netherlands: Kluwer.*

Uys, M, J.; Van Der Walt, C.; Van Den Berg, R. & Botha, S. (2007). English medium of instruction: a situation analysis. *South African Journal of Education, 27*(1): 69-82.

Van den Akker, J. (2003). Curriculum perspectives: An introduction. In J. J. H. van den Akker, W. A. J. M. Kuiper, & U. Hameyer (Eds.), *Curriculum landscapes and trends* (pp. -). Dordrecht: Kluwer Academic Publishers.

Van der Horst. H., & McDonald. R. (1997). *Outcomes-based education : Theory and practice.* Retrieved 2018, from https://uwc.worldcat.org/title/outcomes-based-education-theory-and-practice/oclc/49547579

Welman, J. and Kruger, S. (2001) *Research Methodology*. Oxford University Press, Cape Town.

Yin, R. K. (2011). Qualitative Research from Start to Finish. *Guilford Press*.

Yin, R. K., (2003). *Case Study Research: Design and Methods* (3rd Edition). New Delhi: Sage Publications.

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Bellville, South Africa

APPENDIX 1:

Background information sheet

Dear Sir/Madam,

My name is Dlova, Nombulelo, a Masters student in science education of the Faculty of Education at the University of the Western Cape. I am conducting research on Teacher Challenges with the implementation of curriculum and assessment policy statement(CAPS) in grade 10 Physical-sciences in Butterworth District. The study will be guided by the following research question:

What challenges are faced by Grade 10 Physical science teachers in the implementation of CAPS?

The research participants will comprise Grade 10 physical sciences teachers. Data collection will be in the form of questionnaires and interviews. Participation in this study is voluntary. Participants have the right to withdraw from the research at any stage of the research process without having to give any explanations. Participants are guaranteed utmost confidentiality regarding all information collected from them. Pseudonyms or a system of coding will be used to protect their identity.

Should you wish to find out more about the research, you are welcome to contact my supervisor, Professor Hartley, whose contact details are provided below or indeed me.

Yours sincerely

Researcher: Ms Nombulelo Dlova Supervisor: Prof. M.S.Hartley
Contact number: 0787190306 shartley@uwc.ac.za Tel. 021-9592680
Email: nombulelodlova@webmail.co.za

Signature of the researcher: …….. Date:……

University of the Western Cape

Faculty of Education, Private Bag X17, Bellville, South Africa

APPENDIX 2: PERMISSION LETTER

THE EASTERN CAPE EDUCATION DEPARTMENT

X Secondary School
Butterworth
4960

The District Director
Butterworth
Eastern Cape
Education Department

Dear _____

Re: Permission to conduct research at X School

My name is Nombulelo Dlova, a Masters student in the Science Education Department in the school for SSME in the Faculty of Education at the University of the Western Cape. I would like to request your permission to observe teachers'' interaction in the Grade 10 physical sciences in one of the senior secondary schools in Butterworth district. I am conducting research on the teacher challenges with implementation of CAPS in grade 10 physical-science. The target group will be Grade 10 physical sciences' teachers.

The research will not interfere in any way with the functioning of the school or with learning in the classroom. In addition, participation will be voluntary and so participants will be free to withdraw at any time without giving reasons should they feel uncomfortable with my research. Their participation in the study will remain anonymous. Information received as part of the study will be used for research purposes only. It will not be used in any public platform for any purposes other than to understand the challenges in the implementation of CAPS in grade 10 physical science teachers.

Should you wish to find out more about the research, you are welcome to contact my supervisor, Professor Hartley, whose contact details are provided below or indeed me.

Yours sincerely,

Researcher: Nombulelo Dlova Supervisor: Prof. M.S.Hartley
Contact number: 0733153916 Tel. 021-9592680
Email nombulelodlova@webmail.co.za Email: shartley@uwc.ac.za

Signature of the researcher: …….. Date:……

OPEN – ENDED QUESTIONNAIRES

Name of Teacher: …… School Name: …….

Subject : …….. Grade : …….

1.What challenges do you experience with the completion of the CAPS teaching schedule?

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2. What do you understand by the learner-centred classroom as advocated by CAPS.?

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3. Describe how you perceive the subject matter in CAPS

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4. What are your views on the pacing of CAPS i.e. time allocation versus the aspects in the syllabus?

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5. What resources do you have access to that affect teaching?

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6. Describe the resources you have for practical work.

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7. What are your views on the assessment tasks prescribed in the CAPS?

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8. What are your experiences with the CAPS moderation process?

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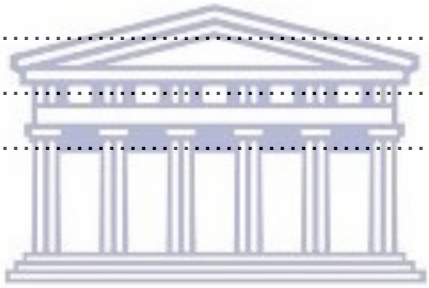

9. What are your views on the value of the training workshops?

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10. What are your experiences with the CAPS cluster moderation and subject meetings?

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11. What were the challenges in the change from the RNCS to CAPS.?

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12. Do you feel that CAPS has brought an improvement in the Physical Science curriculum? Motivate your views.

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13. In what ways do you feel CAPS has enhanced achievement of the learners in Physical Science?

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14. In what ways do you feel CAPS has negatively affected achievement of your learners In Physical Science?

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15. In what ways has CAPS increased motivation among learners when compared to the old curriculum?

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INTERVIEW SCHEDULE –Four Respondents

1. How do you experience using CAPS document to teach Physical Science?
2. Has CAPS enhanced achievement of your learners in Physical Science.
3. What are the factors that affect the teacher's ability to implement CAPS in Grade 10 Physical Science?
4. Are you satisfied with the content displayed in the CAPS document? Explain.
5. How are learners motivated in CAPS as compared to the old curriculum?
6. What are your views on CAPS cluster moderation and subject meetings?
7. Are you satisfied with the pace of the content as outlined in the CAPS document? Explain.
8. What section of the curriculum do you feel is most difficult for you to teach in Physical Science?
9. Do you feel that you have sufficient resources to complete the practical experiments as required by CAPS? If not, explain how the lack of resources affects your teaching.
10. Do you find the training you received for the implementation of the practical components of CAPS is sufficient? Explain.