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GRADE 11 PHYSICAL SCIENCE TEACHERS' XPERIENCES OF IMPLEMENTING THE NEW CAPS CURRICULUM: A CASE STUDY OF CAPRICORN DISTRICT, LIMPOPO, SOUTH AFRICA

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A research report submitted to the Wits School of Education, Faculty of Humanities, University of the Witwatersrand in partial fulfilment of the requirements for the degree of Master of Education by coursework and research

Johannesburg

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Grade 11 Physical Science teachers' experiences of implementing the new CAPS curriculum: a case study of Capricorn District, Limpopo, South Africa

Motshenya Joyce Phooko

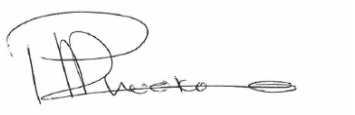
ABSTRACT

Research has shown that difficulties and challenges always arise when a new curriculum is implemented. In South Africa, studies have shown that there are challenges associated with the implementation of the newly introduced curriculum, the Curriculum and Assessment Policy Statement (CAPS). While some studies have investigated the challenges associated with the curriculum implementation, little has been done to unravel the experiences of teachers as curriculum implementers. The major aim of this study was to investigate the experiences of seven Grade 11 Physical Science teachers in implementing the new South African CAPS curriculum. The study was conducted in the Capricorn District, Limpopo, South Africa. Data was collected using a questionnaire and semi-structured interviews. The data was analysed using an adapted framework of curriculum implementation. The findings show that the teachers face a variety of challenges in implementing the new curriculum. The major challenges they have experienced include; lack of professional development, resources, overcrowded classrooms and lack of support and monitoring from the department of basic education. It is recommended that the Department of Basic education should staff develop teachers so as to enable them to handle the new curriculum. Teacher training institutions should also design and implement curricula, which enable teachers to comfortably handle the challenges associated with the new curriculum.

Keywords: Physical Science, teachers, curriculum, implementation, experiences, challenges, South Africa

DECLARATION

I declare that this research report: ***Grade 11 Physical Science teachers' experiences of implementing the new CAPS curriculum: a case study of Capricorn District, Limpopo, South Africa*** is my own unaided work. It is being submitted for the degree of Master of Education at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at any other University.



……

MOTSHENYA JOYCE PHOOKO

20th day of March in the year 2019

DEDICATION

This dissertation is dedicated to my parents; Maserole and Tselahale for your sacrifices and endless support, to my siblings; Mohlatlego and Mancha for the love and support and to my beloved son; Mahlogonolo for always encouraging me to finish this project.

ACKNOWLEDGEMENTS

I would like to express my gratitude to the following people encouraged me to complete this project:

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- Teachers, principals and heads of departments who participated in my study as willing participants.
- My family and relatives for their love, and support.
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CHAPTER 1

INTRODUCTION TO THE STUDY

1. Introduction

This study investigated South Africa Physical Science teachers' experiences and the challenges they faced in implementing the new National Curriculum and Assessment Policy Statement (CAPS). The new CAPS curriculum is an improvement of the Revised National Curriculum Statement Grades R-9 of 2002, and the National Curriculum Statement Grades 10-12 of 2003 and 2005 which replaced the National Curriculum Statement Grades R-12 (NCS). Developed under the National Curriculum Statement Grades R-12 policy, its major goal is to ensure that learners attain and use the information as well as necessary skills to better their lives (Department of Basic Education, 2011). The curriculum was first implemented in 2012.

The CAPS curriculum is prescribed for different levels for a variety of subjects. It has guidelines as well as teaching plans for teachers to follow. It follows what Hoadley (2012, p. 25) describes as a prescribed curriculum. A prescribed curriculum sets out what its designers want the learners to be taught. As a national curriculum it outlines the nation's educational priorities. This it does by defining the subjects and the knowledge to be taught and provides guidance on how this knowledge should be delivered in the classroom. For teachers, this gives guidelines about content knowledge, necessary skills and values that learners are required to master as a result of going through the curriculum (Hoadley, 2012, p. 30).

According to Hoadley (2012, p. 236) the term curriculum refers to all aspects of teaching and learning including intended outcomes, learning activities, assessment procedures as well as teaching methodologies. A curriculum document, therefore, is not only about subject matter content; but also includes desirable teaching, learning and assessment tasks which can help achieve the curriculum aims and objectives (Welch, 2008, p. 324). It conveys basic principles that can shape and guide classroom pedagogical practices, including class management. Curriculum documents normally carry information about how curricula should be implemented.

As noted, this study investigated South Africa Grade 11 Physical Science teachers' experiences of implementing the new CAPS curriculum. The focus was on a conveniently selected sample of teachers (n=7) in the Capricorn District, Limpopo, South Africa.

From the outset, it is important to note that the Physical Science (PS) CAPS document (Department of Basic Education, 2011, p. 8) on which this study is based states that:

> **…**the purpose of Physical Science is to make learners aware of their environment and also to equip learners with investigating skills relating to both physical and chemical phenomena.

As alluded to, teacher understandings and interpretations of curricula are important determinants of proper implementation. This is supported by Molepo (2014, p. 9) who notes that: "teachers are the main people who can implement and translate the curriculum documents". Onwu and Stoffels (2005, p. 80) support this when they say:

> …to successfully implement a curriculum, it is vital to have teachers who are knowledgeable in science, and confident in their ability to conduct science lessons' including conducting investigations.

This means that proper implementation of curricula requires that teachers have adequate content knowledge and requisite pedagogical skills. Given that it is well documented that in Physical Science in the Limpopo province learner performance is poor, it was interesting to find out the experiences and challenges teachers faced in implementing the new curriculum.
In doing so the study also sought to unravel some of the factors that hamper teachers' successful implementation of the new CAPS curriculum. The hope was that unravelling some of these factors could go a long way towards informing teacher professional development particularly in poorly resourced schools such as those found in the Capricorn District of Limpopo, South Africa. The study also documented some of the experiences faced by the Physical Science teachers as well as the challenges and problems they face.

1.1. Statement of the Problem

A consideration of the Grade 12 Physical Science (PS) examination results in the Capricorn District of Limpopo compared to the National average shows this district performs poorly. For example, the Department of Basic Education, School Performance Report (2015) clearly shows that the PS performance in Limpopo is poor compared to the other provinces. This report shows that the number of learners who passed with an average of 40% in PS is dishearteningly less than 40%. For this reason, it was necessary to investigate some of the problems and challenges

faced by teachers which could contribute to this low pass rate. This poor performance necessitates a need to conduct this research.

1.2. Research Objectives

Accordingly, this study aimed to:

- Determine the experiences that teachers have of implementing the new South African CAPS Physical Science curriculum in the Capricorn District of Limpopo; and
- Identify some of the challenges faced by the Grade 11 Physical Science teachers in implementing the new CAPS Physical Science curriculum.

1.3. Research Questions

In order to achieve the objectives of this study, the following research questions were formulated:

1. What experiences of implementing the new South African CAPS Physical Science curriculum do the teachers in the Capricorn District of Limpopo have?
2. What challenges are faced by the Grade 11 teachers in of implementing the new South African CAPS Physical Science curriculum?

1.4. Theoretical Framework

While there are several frameworks, for example, by Penuel, Fishman, Yamaguchi, by Gallagher (2007) which focuses on professional development prior to curriculum implementation using the GLOBE Program and by Yan (2012) which uses the cascade model to foster curriculum implementation, I chose the Rogan and Grayson framework as it is developed for a South African context. This theoretical framework comprises of three constructs which are; Capacity to Support Innovation, Profile of Implementation, and Support from Outside Agencies. Each construct is also made up of sub-constructs, such as teacher factors, learner factors and assessment practices. In Chapter Two, this framework is discussed in detail.

Profile of Implementation is defined by Rogan and Grayson (2003) as a way to describe methods through which new ideas and practices are implemented and experienced in the classrooms by the teachers. It takes into consideration that teachers are different resulting in different ways of implementing the new curriculum. For each school, the context and capacity are important for the CAPS to be implemented successfully. Rogan and Grayson (2003) further described Capacity to Support Innovation (for example, resources in place to support curriculum implementation, what teachers do in class and what learners do in class) as a way to try to understand and explain in-depth on factors that can support, or deter, curriculum implementation in an organisation like a school. Rogan and Grayson (2003) also describe the construct of Outside Agencies as the different institutions that can support the school from out of the school environment that can support the school to implement a curriculum successfully, which includes the departments of basic education.

1.5. An Overview of the Literature Review

While teaching staff are regarded as members of the school that should implement a new curriculum, they are in most cases not involved in the development of these documents. For this reason, implementation might not be done properly or effectively. Implementation of a curriculum can differ from one teacher to the other. This can affect learning and examination results in either a positive or negative way. At the same time a curriculum should be formatively evaluated to determine if is still serving its purpose. If it not serving its purpose, then it's necessary that support be put in place to ensure proper delivery. Taole (2015, p 267) suggests that the key fundamentals in improving the quality of education are, curriculum review and revision. She goes on to say that teachers must be equipped with the resources and content knowledge which will enable them to implement a curriculum as they are the chief drivers of good quality education. For teachers to teach following any curriculum, they have to be well trained, supported, motivated and encouraged as they deliver the policy. Taole (2015) identifies the following factors as contributing to curriculum implementation; lack of teacher training, resources, support from subject-advisors, parental support and involvement, and classrooms being overcrowded.

The development and implementation of new curriculum is common global feature. South Africa is not an exception. In many cases curriculum documents are well structured and documented but not always well implemented. According to Rogan and Aldous (2005) this

might be so because the focus is mostly on the initial stages of putting together the policy documents and not on implementation. Curriculum implementation is defined to be a continuous process that can be negotiated, contested. It is also unpredictable. It can result in policy adaptations that cause unexpected outcomes (Guro and Weber, 2010, 246; Taole, 2015, p 268). A variety of factors have an effect on implementation. Evaluation and support along the way becomes a necessity.

In South Africa, little research has been done on documenting CAPS implementation. However, researchers have studied implementation of previous curricula. For example, Bantwini (2010) conducted a study on curriculum implementation on the Revised National Curriculum Statement (RNCS) in the Eastern Cape. His findings were that teachers were not properly introduced to the curriculum and that there was lack of professional development for teachers to understand what they needed to do in the classrooms. A similar study in KwaZulu Natal, by Maharajh, Nkosi and Mkhize (2016) found that teachers' lack knowledge of the CAPS policy. They blame insufficient training and lack of support from curriculum advisors. They note that subject advisors who were responsible for conducting training workshops were not adequately trained about CAPS. Additionally, they isolate lack of resource such as laboratory equipment and chemicals, playing fields, and overcrowded classrooms as impediments to curriculum implementation. These studies are similar to the one by Rogan and Grayson (2003) who used their curriculum implementation theory to conduct research at Masifunde School, Mpumalanga Province on Outcome-Based Education (OBE) implementation. They found that teacher understanding, and views of OBE implementation was just a change in teaching style. Specific and critical curriculum outcomes were ignored.

Outside South Africa, Cronin-Jones (1991) investigated the curriculum implementation process in some middle school science classrooms in the northeast of Georgia, in the United States. They found that teachers' beliefs had an impact on curriculum implementation. In the United States (US) Roehrig, Kruse and Kern (2007) found that teachers' beliefs have a great impact on teaching and learning in the classrooms. They note that school site issues are important in the implementation of the curriculum. Their study focused on a large urban school district in Ocean Valley, US.

In a related study, Mapotse and Gumbo (2013) document some challenges contributing to curriculum implementation. They cite new terminology and content to be learned by the

teachers as crucial challenges. Similarly, Peers, Diezmann, and Watters (2003) found that limited teacher knowledge of formal science, low teacher confidence, inadequate resourcing was not related to Kuwaiti culture and society. Furthermore, the teachers noted that each and teachers' capability to adapt to learner-centred classrooms were factors that contributed to poor curriculum implementation. This is in line with Maluleke (2015) who documents some of the challenges faced in implementing curriculum such as; absence of essential resources, not being allocated enough time to implement the curriculum, different views on how to achieve results, individual teaching staff and school agendas, the attitudes the community has towards the school, and lack of resources used to teach and learn. In Kuwait, Alshammari (2013) discovered that science teachers' unhappiness with the content of a new science curriculum affected implementation. They also found that teachers thought that the content they had to deliver to the learners was difficult to teach and that the content lesson were loaded with lot of information, and the allocated teaching time allocated was too short to cover all the work they had to teach. In a similar study, Yan (2012) identifies teachers lack mastery of content knowledge and poor English proficiency as challenges in new curriculum implementation. He also suggests learner resistance as another factor that affected curriculum implementation.

In Chapter Two of this report a further discussion of challenges faced by Science teachers in implementing new curricula will be done.

1.6. Research Design and Methodology

For this case study, a combination of quantitative and qualitative data collection instruments was used. The participants (n=7) in the study being reported here were: 4 science teachers; 2 heads of department (HOD), and a school principal. Three schools were conveniently sampled to participate in the study. Data was collected through a questionnaire and semi-structured interviewing. The questionnaire comprised of biographical information and Likert type questions on challenges and experiences. The Rogan and Grayson (2003) framework was used as the theoretical framework to guide data analysis and interpretation. Before collecting data, research ethical clearance had to be obtained from both the School of Education at the University of Witwatersrand and from the Limpopo Education Department.

1.7. Chapters Organisation

This report is organized as follows:

Chapter 1: **Introduction to the study**: In this chapter, the general background of the study is outlined. The purposes of the study and research questions are stated. The theoretical framework guiding the study is briefly discussed. The literature related to the study is also outlined.

Chapter 2: Theoretical Framework and Literature Review: A detailed account of the theoretical framework and the literature related to the study is given in this chapter. Some experiences of teachers in implementing new curricula challenges are teased out and discussed.

Chapter 3: Research Methodology: The research design, and data collection methods used in the study are discussed in this chapter. The research instruments that were used and their administration are discussed. Issues relating to instrument validity are discussed. Details of the data analysis procedure are described.

Chapter 4: **Results and Discussion:** The results gathered from the study are presented and discussed in this chapter. The results gathered from the questionnaire and semi-structured interview addressing the two research questions focusing on teachers' experiences of implementing the curriculum and challenges the teachers face in implementing the curriculum.

Chapter 5: Conclusions, Implications and Recommendations: Conclusions from the study are drawn. Implications and recommendations of the study are fleshed out.

1.8. Chapter Conclusion

The major objective of this study was outlined in this chapter. The research questions of this study were presented. The theoretical frameworks as well as literature review were briefly outlined. The methodological design and approach were outlined. In the next chapter, the theoretical framework and literature review of this study are discussed in detail.

CHAPTER 2

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

2. Introduction

In this chapter, the theoretical framework used for this study as well as the literature review related to the study are detailed. The constructs and sub-constructs of the chosen theoretical framework are unpacked and elucidated.

2.1. Theoretical Framework

As noted in Chapter One, this study used the Rogan and Grayson (2003) framework as the theoretical lens. Rogan and Grayson's (2003) framework consists of three major constructs which are; Capacity to Support Innovation, Profile of Implementation, and Support from Outside Agencies and each of these construct is made up of sub-constructs as seen in Figure 2.1.

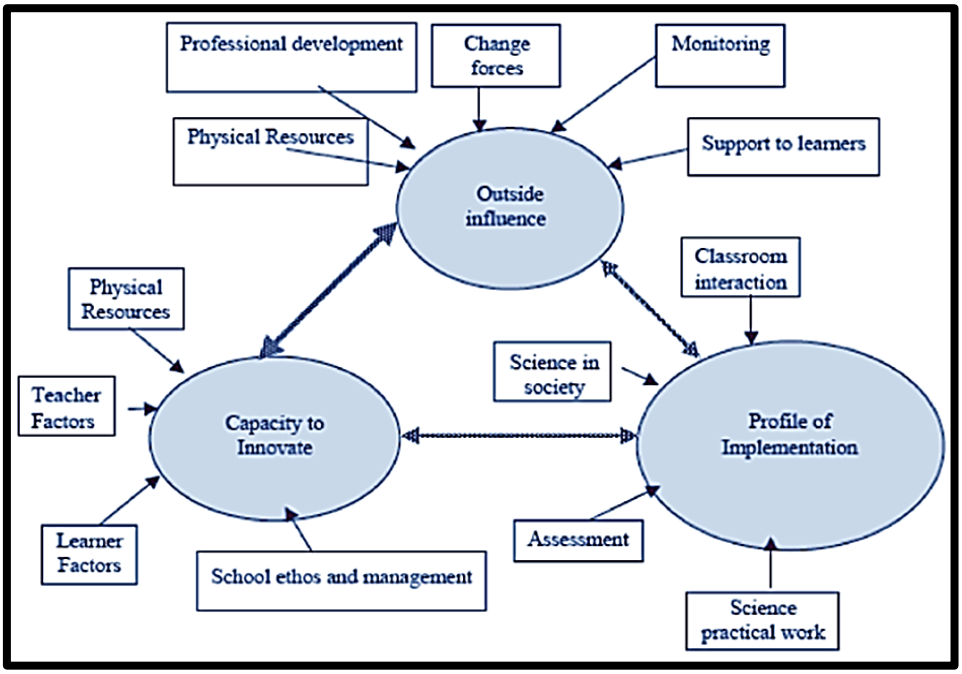


Figure 2. 1: **The theory of curriculum implementation framework (Rogan and Grayson, 2003, p. 1173)**

2.1.1. Profile of Implementation

Rogan and Grayson (2003) define the Profile of Implementation as a way to describe how a new curriculum is implemented and practiced in the classrooms by the teachers. It takes into consideration that teachers are different and this will result in different ways of implementing a new curriculum. There is the assumption that what is considered to be excellent will develop. This framework is designed in such a way that a path of each subject can be mapped out to give different routes to be taken to any destination. This gives curriculum implementers at the school, a chance to map out where the school is highlighting the strengths. Each school takes its context, culture and capacity into consideration and chooses its own route for the CAPS to be implemented successfully over a period of time. Curriculum implementation is not a once off event, but an ongoing process. Feedback from teachers and other stakeholders is essential.

The Profile of Implementation sub-constructs are: classroom interaction (teacher action and learner action; what learners do on their own; the use of the practical component in science by teachers, design a project for learners to carry out where they have to use science to solve a problem in a community and assessment methods (Rogan and Grayson, 2003). The classroom interaction and assessment sub-construct applies to any subject. Science practical work is unique and specifically applies to science subjects. This is where progress can be measured from teacher-centred demonstrations which are a level one to a more open-minded learner-centred investigation which is a level four. The science in society sub-construct looks at the progressive movement from how science can be applied daily to how this application can be used in the community and engaging the community in science projects.

These sub-constructs show an increase in teacher practice and progress from level one (lower level) to level four (higher level) as seen in Table 2.1. Rogan and Grayson (2003, p. 1182), further elaborate that:

> … A lesson that is well-organized, the learners are attentive and where the teacher is the only one who teaches, learners write tests with more recall questions and less analytical questions. This is a good transmission type of a lesson (Level four is more towards learner centred, where variety of assessment tools are used.

Table 2. 1: Example of how Profile of Implementation for Science education can be mapped at school (Rogan and Grayson, 2003, p. 1183)

Level	Classroom Interaction	Science Practical Work	Science in Society	Assessment
1	**Teacher**: Follows the designed lesson plan and deliver the content by following the lesson plan. **Learner:** are always attentive and engaged. Give answers when asked questions and can ask questions.	Classroom demonstrations is used by teachers to help learners to understand concepts better.	The teacher uses examples and how science can be applied in everyday life to demonstrate scientific concepts.	Only pen and paper tests are the only way learners can demonstrate their knowledge and understanding. The questions in the tests are mostly recall type, but there are some that require critical thinking.
4	**Teacher:** Acts as a **f**acilitator to learners as they are given long term project and investigations to design and start. **Learner:** Are responsible for their own learning as they are engaged in class; are involved in the planning and assessment of their learning at school.	Learners are given a task to design and carry out their designed investigation.	Learners carry out a project where science is applied to resolve a problem a community is facing or use science to provide what the community what need.	Final assessment includes performing investigations and projects that will benefit the community.

2.1.2. Capacity to Support Innovation

The second construct; which is the Capacity to Support Innovation is described in Rogan and Grayson (2003), as an effort to try to understand and explain in details the factors that can support or deter the implementation of a new curriculum in an institution like a school. Not all schools have the physical resources, and support to properly implement a curriculum to the same extent due to different socio-economic factors, location, resources, and availability of teachers. The four sub-constructs under the Capacity to Support Innovation are; availability of

physical resources, teacher factors, learner factors and the school ecology and management (Rogan and Grayson, 2003).

Physical resources can certainly hinder implementation of new curriculum in a school. Lack of resource limit the performance of teachers and learners' and also influence the learners' ability to understand concepts. The teachers' background, training, qualifications and level of confidence, can also hinder implementation of curriculum in a school. The lack of content knowledge (CK) by teachers in many parts of South Africa has been found to directly influence implementation. To add on to this teacher factor, it has also been found that teachers who usually work in isolation will perform unsatisfactorily compared to teachers who collaborate more often as they can share their knowledge and other resources. The learners' background as well as the strengths and limitations that they have and might bring into the classroom can hinder implementation of a curriculum. Home background factors such as having no place for to do homework can also affect learning and hence curriculum implementation. Lack of support structure at home and someone to help with homework can also hinder curriculum implementation. Such learners will certainly perform poorly. Learners might be absent from school for longer periods for a variety of reasons.

In South African schools, many learners' performance is affected by the language of instruction. This is because the language of instruction is not their first language. The general school ecology and school management is another factor that can hinder implementation of curriculum in a school. These factors might be different but they are closely related to each other especially in developing countries. In dysfunctional schools, there will be no proper implementation and for the school to function properly discipline is important. In many schools that function properly, the principals are the ones who instil discipline.

Rogan and Grayson (2003, p. 1187) state that:

> …In each case, as the level increases, it indicates a greater capacity to innovate. It is different from the Profile of Implementation, as the levels indicate progress and as with everything, a school would want to attain level four in all the constructs.

In their study they found out that, there are some High Schools with similar resources, but their Grade twelve examination results were different. The main contributors to the, Capacity to Support Innovation is both the teacher and school management factors. The main vision was

shared and everyone was working towards that vision. The teachers and principal create conducive environment for learning and learners as well as the parents support them.

Table 2. 2: Example of how Capacity to Support Innovation for Science education can be mapped at school (Rogan and Grayson, 2003, p. 1188-1190)

Level	Physical resources	Teacher factors	Learner factors	School ecology and management
1	There are classrooms and one office, even though the condition is unsatisfactory . There are toilets available at the school. There are a number textbooks available but they might not be enough for all the learners taking the subject.	Teacher does not have a teaching qualification. Teacher is under-qualified for Position.	Learners have small ability to express themselves, read and write in English as the language of instruction but they are a number of grades below their actual grade level.	**Management:** Timetable, class lists and other practices are available and there is evidence. The principal's presence is not always felt in the school, and teaching personnel attend meetings which are held at set days and times. **Ecology:** School functions effectively; teachers deliver their lessons and learners learn their work most of the time, even though it is not a regular occurrence. The school is a well protected environment and only authorised individuals are given access.
4	Classrooms and offices are in excellent condition. The Science laboratory has adequate equipment. Library or resource centre is available with resources. There are enough curriculum materials for all learners besides textbooks. There are other good teaching and learning resources like Science models, computers. The sports grounds are looked after and they are attractive. There is a good copying and printing equipment.	Teacher is knowledgeable in the subject matter and is over-qualified for the position Teacher is committed to teaching as he/she can organise extra classes or Saturday lessons. commitment to teaching. Teacher are willing to improve on their teaching and can collaborate with other professionals. Teacher participates in professional development in both national and international platforms.	Learners are confident in writing, reading and speaking in English as the language used in classrooms for teaching and learning. Learners are responsible for their own learning. Learners are willing to try new ways of learning.	**Management:** The principal is a visionary but There is a visionary, but he is also involved in the leadership at the school. **Ecology:** There is a shared vision and mission at the school and everyone is working towards achieving the goal. Change is supported and monitored by relevant stakeholders. Collaboration of teachers, school governing body, parents, community and learners is encouraged and practised.

The four factors together give an outline of the capacity of a school to innovate. The innovation has to do with the implementation of a new curriculum. Teacher and learner factors mostly affect what goes on in the classroom. Availability of physical resources and parts of the school ecology also influence what happens at the classroom. If there is a change from a lower level to a higher one, this is an indication of a greater capacity to innovate. The levels indicate how one progresses from one level to the other. The main target for any school would be to move from a lower level and achieve level four in all the constructs described (Rogan and Grayson, 2003) as stated in table 2.2.

2.1.3. Support from Outside Agencies

The third construct, which is the Support from Outside Agencies is described in Rogan and Grayson (2003), as organisations outside the school, including departments of education, that interact with a school in order to facilitate innovation. The main innovation of interest is the new curriculum implementation. This construct clearly defines which school is from developed or developing countries as educational innovation in developing countries is always funded and controlled by agents from developed countries (Rogan and Grayson, 2003). In South Africa, support from outside agencies comes from traditional sources such as, the National Department of Education, nine Provincial Education Departments, and Non-Government Organisations (NGOs). As one moves through the levels, professional development should be offered, which is focused on implementing change and not just giving out information to the curriculum implementers. This is to empower the teacher, and to better prepare them for effective curriculum implementation.

The second sub-theme is about the levels and the period of support at the school. The levels are from one workshop to a continuous, on-going school-based development and empowerment for curriculum implementers. There are different kinds of agencies that an organisation chooses to use in bringing about change to the school. The forces are a way to provide support as well as applying pressure to the institutions. Pressure is classified as the different forms of monitoring and accountability.

Table 2. 3: Example of how Support from Outside Agencies for Science education can be mapped at school (Rogan and Grayson, 2003, p. 1193-1194)

Types of encouragement and support					
Level	Physical Resources. Categories of resources: buildings, apparatus, curriculum materials (print and electronic), computers, etc.	Design of professional development	Direct support to learners	Dominant change force evoked by agency	Monitoring mechanisms and accountability
1	The resources needed are supplied in addition to what was there before even though it is not enough to provide for the existing participants. Only one category is catered for.	Only one, once in a while workshop is presented to the teachers. When it comes to curriculum changes and expectations, the information is just given to the teaching staff.	Basic needs like school lunch and places to study or do homework are provided.	Bureaucratic. Information regarding change is from the top filtered to the bottom.	School based inspections from resources and staff personnel is conducted by department officials.
4	All the resources that are needed to effectively support curriculum change are provided in two or more categories. Most if not all categories are sufficient to all the recipients.	Teaching staff takes responsibility of their own growth and development to affectively impart knowledge. Outside agencies are also invited to offer professional growth and development to the staff to effectively implement the curriculum and run the school effectively. There is an on-going school support system by the department of basic education.	There is monetary means available, like bursaries and scholarships to support academic and personal support to the learners.	The school environment supports leaning. Change is communicated with the affected personnel as they are all working towards the same goal.	On-going monitoring and evaluation is conducted by the school management. .

For the theory of curriculum development to be implemented, there must be a relationship between these three constructs. According to Rogan and Grayson (2003), different propositions are put in place describing the hypothesized inter-relationships between the constructs. The first proposition as described by Rogan and Grayson (2003, p 1195) as:

> …There is a zone of feasible innovation. The only way innovation takes place, it is when it moves from one level to the next. For effective innovation to take place, the steps that are in place must be introduced in a practicable manner.

For curriculum implementation strategies to work and be regarded as being 'good', then there must be gradation from one level to the next. If you get a teacher who has limited resources and classified to be on level one on the Profile of Implementation, she will be unlikely move to level four as seen in table 2.3 above. The second proposition as described by Rogan and Grayson (2003, p 1196) is that"…for Profile of Implementation to be well developed, Capacity to Support Innovation needs to developed alongside it".

There is a possibility that the Profile of Implementation and Capacity to Support Innovation construct are related to each other. To bring change, the third construct must also be included. The third construct is described by Rogan and Grayson (2003, p 1197) as:

> …Outside Support to be developed, the other two constructs must show that there is a need for it. The size, needs of the school must be taken into consideration to determine how much is needed to develop this construct.

Proving schools with no electricity and running workshops for teachers if the schools do not have either laboratories nor equipment is pointless. There should be workshops for teachers to give them enough information to get them to operational level. The fourth proposition as described by Rogan and Grayson (2003, p 1198) is:

> …Everyone who is directly involved in implementing a curriculum need the opportunity to reconceptualise the intended changes in their own way and the way they relate to the changes.

This theory of learning and imparting knowledge needs a strategy to be filtered to the learner. The fifth proposition as described by Rogan and Grayson (2003, p 1200) is:

> …A change in teaching and learning practices should rather be viewed as a change of culture.

Changes that happen where teachers and learners improve their position on the Profile of implementation as described above are not done so in line with the sub-constructs.

The sixth proposition as described by Rogan and Grayson (2003, p 1201) is that:

> …When the main participants in the school environment under all constructs, is aligned with all

the constructs and the primary level of the school as a system.

Any change that is introduced at a school, should be done in a way that learning experience is enhance as it is the primary level in a schooling environment. Outside Support should be also be designed in a way that it will also enhance learning experience for the learners. The same goes to the Capacity to Innovate, all the constructs should be aligned to support learning experience of learners. Profile of Implementation should like the other constructs be aligned to enrich learning experience.

Rogan and Grayson (2003) adapted Vygotsky's (1978) idea of Zone of Proximal Development (ZPD) to curriculum development in a school environment (Lelliott, Mwakapenda, Doidge, du Plessis, Mhlolo, Msimanga, Mundalamo, Nakedi & Bowie, 2009). Curriculum development in a school environment is referred to as the Zone of Feasible Innovation (ZFI). There is a hypothetical construct which states that current school practices should not exceed their desired innovation by a big gap. Small steps should be taken from the current practice to the desired goal in order for this innovation to be successful. The constructs are in such a way that the schools are given various levels of development and ways in which they can analyse and know their position and ways in which they can move from one level to the other through the ZFI. This indicates effective implementation.

It was decided that the utilisation of a questionnaire and an interview as research tools for this study might identify and describe the level where each teacher is operating regarding curriculum implementation. In the process taking into consideration all the sub-constructs and their meanings and how they interact. Through adopting this framework, it was envisaged that the two research questions outlined in Chapter One could be answered.

2.2. Literature Review

2.2.1. Studies on Teacher Experiences of Implementation of Curricula

Not many studies have documented on teacher experiences. Maharajh et al. (2016) conducted a study on primary school teachers in the KwaZulu Natal province. In this study, Maharajh et al. (2016) gathered data using semi-structured interviews. The study revealed that teachers' lack of knowledge of the CAPS policy, insufficient training and lack of support from curriculum advisors hindered teachers to effectively implement the new curriculum. It was

further found that subject advisors who conducted the training workshops were not adequately trained about CAPS. Lack of resources including laboratories also negatively affected curriculum implementation.

In his study, Rogan (2007) used a questionnaire, videotaped some lessons, and conducted interviews with teachers in the Mpumalanga Province to collect data on implementation of the Curriculum 2005 (C2005). This curriculum was based on the outcomes-based education (OBE) concept. The Masifunde School in the Mpumalanga Province where the study was conducted, 392 learners in Grades 7–9 were participants in the study. Fifteen staff-members were involved. The main finding was that teacher understanding of OBE implementation was seen as a change in teaching style. Not much done about the achievement of the specific and critical outcomes stipulated in the curriculum document. The study recommended professional support to teachers and setting realistic, applicable to their school environment implementation targets. The Natural Science learning area was the focus. The School Governing Body (SGB) was active in the school. The school policies to be implemented were drawn up and known by all parties concerned. The principal was involved in teaching Grade 8 Science. While there were no teachers with university degrees the teachers were motivated and dedicated to their work. Rogan (2007) concluded that language proficiency ranged from poor to reasonable. The learners were well-behaved, hard-working and motivated. Absenteeism was not a problem at the school. Majority of the learners at the school were not sufficiently fed at home, and there was no feeding scheme at the school. However, language was a barrier, at the Grade 7 level. Other problems identified were lack of general knowledge and teachers' pace of teaching and the learning pace was slow. There was a great need for science equipment, chemicals, apparatus, and furniture in the library and the laboratory. At the school, workshops by the Department had been conducted for science and mathematics teachers. The teachers found the workshops to be beneficial and well facilitated even though they still needed help in implementing C2005. The teachers initiated extra lessons and learners attended. The teachers were satisfied with the changes but there were concerns about the inadequate support and slow pacing of teaching and learning. While the teachers were more than willing to change, they were overwhelmed by the task they had to undertake.

Another example of curriculum implementation research study on experiences of teachers was conducted by Bantwini (2010) on the RNC in the Eastern Cape. The participants in this study were Grades 1–6 primary school teachers. The teachers who were interviewed in this study

were mostly female, their age range between 30 and 60 years of age and with 4 to 35 years of teaching experience. Most of these teachers received their qualifications at Teacher-Training Colleges. Bantwini (2010) used both questionnaires as well as interviews to collect data for his study. The findings were that teachers were not properly introduced to the curriculum and also that there was lack of professional development for teachers to understand what they need to do in the classrooms. This study indicated that teachers did not understand the curriculum improvements, they were not properly introduced to the curriculum and there was lack of professional development to understand what they need to do in the classrooms.

In Bantwini's (2010) study, the teachers who were interviewed in this study were mostly female, with age ranges between 30 and 60 years and with 4 to 35 years of teaching experience. It was cited that most teachers received their qualifications from Teacher Training Colleges. Some were unqualified in the areas of Science and had weak pedagogical content knowledge (PCK). The meanings and understanding of RNCS differed from one teacher to the other. It was found that no teacher expressed positive feedback with regards to support given to the teachers to successfully implement the curriculum. Some teachers expressed that this curriculum implementation was work overload for them. The was lack of support from parents to make sure that learners do their school work and to help them where necessary. In addition to teaching the formal school curriculum, teachers felt like they were doing basics that parents should be doing.

In a similar study, Roehrig et al. (2007) used semi-structured interviews and classroom observations, in Ocean Valley in the United States to explore the factors that influenced the implementation of an inquiry-based chemistry curriculum. Semi-structured interviews were also used to develop a deeper understanding of the teachers' experiences with the curriculum. The study found that teachers' beliefs influenced their teaching greatly. Knowledge transmission, maintain a curriculum that is rigorous, being efficient and learner preparation for examinations were factors identified to as beliefs that influenced the science curriculum implementation (Roehrig et al., 2007).

Another international study on curriculum implementation experience was conducted by Cronin-Jones (1991). This study's aim was to investigate the process of implementing curriculum in middle school focusing on science classrooms in Georgia, the United States. She used qualitative research technique. The results showed that the teachers' belief had an impact

on curriculum implementation. Cronin-Jones (1991) also reports that teachers' beliefs about discipline were essential in a classroom.

2.2.2. Challenges faced by science teachers in implementing new curricula

Although some studies concerning challenges around curriculum implementation have been done, not much has focused on Physical Science teachers' challenges as they implement the new curriculum. In their study, Mapotse and Gumbo (2013) found that teacher development and empowerment are main the main challenges that were found to contribute to curriculum implementation. A similar study by Peers et al. (2003), reported that in primary schools, there were concerns about teaching Science. These concerns surrounded limited teacher knowledge of formal Science. In their study Adler, Pournara, Taylor, Thorne and Moletsane (2009) also raise such concerns as; low teacher confidence, inadequate resourcing and teachers' capability to adapt to learner-centred classrooms. All of these factors contributed to poor performance especially in Science. Some of the challenges also isolated include inadequate resources, not enough time for implementation, and not everyone agreed on ways to achieve results. Factors such as; individual and institutional agendas; community attitudes; inadequate resources; not enough time for curriculum implementation, top-down organisational systems are also isolated in a study by Maluleke (2015). Similarly, in Kuwait Alshammari's (2013) found that the teachers were not happy with the content in the Grade six and seven science curriculum. In this particular study teachers also isolated new content, students' culture, religion, society, and geographic environment as challenges.

A related study by Monyane and Selesho (2012) used mixed methods to gather data from Motheo schools in the Free State Province. Questionnaires and/or interviews were used to collect data. This study focused on the RNCS. It was that the RNCS had many shortcomings and needed refinement. Monyane and Selesho (2012) recommended that teacher training and development must be done before rolling out the new curriculum. Another study by Mbunyuza-de Heer Manlah (2016) found that communities in which the schools were located, which were mainly rural areas, lacked the resources that could instil productive and receptive skills in learners. From this study access to resources was isolated as a major challenge. Similarly, Bantwini (2010) used questionnaires and interviews were tools used to collect data for this study and found that teachers believed that the curriculum reform was overloaded with too much paperwork and that there was lack of in-service professional development for teachers.

These findings support Taole (2015) who used questionnaires and interviews in his research and found that lack of teacher training, resources and support to schools were challenges to curriculum implementation. In China, Yan (2012) found that; there were a great deal of professional and psychological challenges experienced by teachers as they had to replace the teacher-centred approach with the student-centred approach. Students' resistance was also isolated as a factor.

2.3. Conclusion

In this chapter, the Rogan and Grayson's theoretical framework and how the constructs are linked were explained. The literature about challenges faced by science teachers in implementing new curricula was explored. The next Chapter looks at the Research Methodology.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

3. Introduction

This chapter will describe the methodology used to generate data regarding experiences of implementing the new South African Physical Science curricula and the challenges faced by science teachers in implementing the new curricula. Methodology deals with analysis and how research methods are described. It is defined by Opie (2006, p. 10) as:

> …the theory of acquiring new knowledge, by implementing methods or procedures, where data will provide evidence for the construction of knowledge about what the researcher is looking for.

In this study, both the qualitative and quantitative research methods were used. In addition, the data collection tools used during the research, sampling technique, reliability and validity issues are explained. Data analysis process that was used will also be explained. Ethical issues related to the research will be outlined.

3.1. Research design

Research design is an important part of research; its purpose is to provide information that is valid, accurate, and reliable from the research questions. It is a plan on how data will be collected, analysed and interpreted (Maluleke, 2015).

Both qualitative and quantitative research methods were used. A questionnaire collected the quantitative data, which was analysed using descriptive statistics. A questionnaire and an interview were used to collect qualitative data. Polkinghorne (2005) emphasise that the purpose of gathering information in a qualitative research is to provide evidence in an investigation or study. Once the data is gathered, the researcher will analyse the data and produce the experiences or the findings of the study (Polkinghorne, 2005). As the study objectives are about teacher experiences and challenges during curriculum implementation. The data was analysed using a rubric based on Rogan and Grayson (2003, 2005).

3.2. Sampling and participants

Sampling is a way of selecting participants for the study. There are various sampling methods. For this study, participants were conveniently selected. According to Marshall (1996), convenience sampling is the least rigorous technique for qualitative study. It entails the selection of the most accessible subjects or participant for a study. The reason for convenient sampling was due to time and financial implications as well as the proximity to the researcher.

Four Grade 11 Physical Science teachers, two HOD's and one principal from three schools with pseudonyms of School A, School B and School C were sampled from the Capricorn District of Limpopo. The schools are all located in a township. The participants were a teacher and one principal from School A, one teacher and one HOD from School B and two teachers and one HOD from School C.

The teachers, principal and HODs completed a questionnaire delivered at the schools by hand. The first section of the questionnaire required demographic information on the teachers. The information sought was on teaching experience, age, qualifications, nationality, and highest qualification. Of the seven participants, six are male and one is female. Six of the participants held a university degree and only one had a diploma from college. Only one of the participants had more than 31 years of teaching experience, two had between 21 and 30 years of teaching experience, two had between 11 and 20 years of teaching experience, one had 10 years of teaching experience and one had less than 5 years of teaching experience. All of the participants are black South Africans. At all the schools, the language of instruction is English and the schools are all based in a township. Teacher workload was generally low for most of the participants. Only two reported that they had a heavy workload. All the participants had attended a few workshops although they said they did not acquire much from them.

3.3. Data collection instrument

The data collection tool that was used to determine the experiences of teachers in implementing the new curriculum and the challenges they face when curriculum is implemented. As already noted, a questionnaire and interview were used to gather data for this study.

3.3.1. Questionnaires

For this study, the questionnaire (Appendix A and B) used comprised of two sections. Section A was on the biographical information and section B was a three-point Likert type questionnaire. Respondents were asked to indicate their answers along a scale ranging from 1= agree, 2= disagree, to 3= not sure. This made the answers easy to quantify. However, it has been pointed out this kind of questioning might not validly and accurately capture participants' views and opinions on an issue (Opie, 2006). The questions were structured in such a way that they offered the participants the opportunity to express their points regarding the implementation of a curriculum as well as factors that might have an impact on implementation. The participants were given as much time as they needed to complete the questionnaire. As noted, the Rogan and Grayson rubrics were used to analyse the data.

A questionnaire is an economical way of collecting data. It encourages greater honesty, especially when administered in the absence of the researcher, for example by post. It tends to be more reliable due to anonymity. The participants can be anonymous. This eliminates bias. It is self-reporting, where participants report on what they think and not on what they do. However, there is always anger if questions are not be clear (Creswell, 2012, p 403; Cohen, Manion & Morrison, 2004, p 267).

3.3.2. Teacher interview schedule

The researcher used a semi-structured interview with one participant at each school. At School A, Tshepo was interviewed in his office and Lerato in the staff room. At School B, Mandla was interviewed in his office and Sputla in the staff room and at School C, David was interviewed in the staff room, Sizwe was also interviewed in the staff room and Thabang was interviewed in his office. The aim of the interviews was to get more information regarding the challenges and experiences faced in implementing the CAPS at various schools.

An interview allows the interviewee to ask questions for clarity, it provides useful information when the researcher cannot directly observe the participant. It allows the participant to describe detailed information from the participants' point of view and the interviewer can ask sensitive questions. It does not however, protect anonymity of the interviewee. During the interview, the interviewer needs to pay attention to the interviewee. The presence of equipment to record the interview might be a problem. The interviewee, therefore always needs to be assured of

confidentiality and anonymity. This is what was done in this study (Creswell, 2012, p 218, 384; Cohen, et al., 2004, p 267).

3.4. Validity

There was no pilot study conducted for the questionnaire due to time constraints. However, most of the questions were adapted from other studies related to curriculum implementation research studies (Taole, 2015; Bantwini, 2010). The questionnaire and interview questions used in this study have been used by Taole (2015) and Bantwini (2010).

Kimberlin and Winterstein (2008) define validity as the extent to which an instrument measures what it supposed to measure. Validity is the extent to which the interpretations of the results of a test are warranted and it depends on the purpose of the test. According to Opie (2006), validity is the degree to which a method, a test or a research tool measures what it is supposed to measure.

During the interview, the questions were phrased in a way that the participants would understand. The questions were not asked in a way of supporting the researcher's predetermined ideas to avoid unfairness. Validity was increased by adding HOD's and/or principals to the study. Their involvement increased the validity of the data provided by teachers. Nunnally (1978) in Yaghmaie (2003) argue that the sampling of the items and the method of constructing the items are important in ensuring validity.

Johnson (1997) described five types of validity that are important in qualitative research; descriptive, interpretive, theoretical, internal and external validity. According to Johnson (1997), descriptive validity refers to the factual accuracy of the account as reported by the researcher. Johnson (1997) further defined interpretive validity as the accuracy in reporting the facts. Interpretive validity requires developing a window into the minds of the people being studied. Theoretical validity is argued to be the theoretical explanations developed from a research study that fits the data and is credible and defensible. Internal validity is the degree to which a researcher is justified in concluding that an observed relationship is causal. External validity is about applying the findings of a study outside the context in which the study was done (Johnson, 1997).

3.5. Data Analysis

Section A of the data collection tool was used to gather biographical information of the participants. Section B was the Likert questionnaire. Section C was the semi-structured interview section of the study. Data collected from these sections provided a large portion of the results of this study. The data were categorised into sub-constructs of; Profile of Implementation, Capacity to Support Innovation, and Support from Outside Agencies in line with the Rogan and Grayson (2003) framework. These sub-constructs will serve as themes that create meaning to determine the experiences that teachers have of implementing the new South African CAPS Physical Science curriculum in the Capricorn District, Limpopo. They will also give insight into identifying some of the challenges faced by the Grade 11 Physical Science teachers in implementing the new CAPS curriculum.

To indicate where each teacher was with regards to curriculum implementation, corresponding levels under each sub-construct of; profile of implementation, capacity to support innovation, and support from outside agencies were aligned depending the teacher's interpretation and implementation of the curriculum. As has been pointed out, the levels range from one to four-moving from the teacher-centred approach to the learner-centred (Rogan and Grayson, 2003). An example of this is given in Tables 3.1, 3.1 and 3.3.

Table 3. 1: Curriculum implementation framework for School A

1. Profile of implementation

Level	Classroom Interaction	Science Practical Work	Science in Society	Assessment
1	Lerato follows the CAPS documents for Physical Science. She uses the prescribed textbook which she finds not to be entire useful to use in her classroom. She presents science content in a well organised and well sequenced, based on a well-designed lesson plan. Provides adequate notes for the learners to use when studying. Her lesson plans are easily accessible, and she follows them as she had planned. She poses questions to learners and they sometimes give her answers and other times they are not really interested in what she is teaching. Learners can freely ask questions in Lerato's classroom even though it's not all of them or some of them might not be relevant to the work at hand.	Lerato uses classroom demonstrations to help develop concepts as there are no apparatus that the learners can use to carry out the practical on their own. There is no laboratory for the learners to conduct investigation, and there are no laboratory equipment to carry out any investigation.		
2			Lerato stated that she does encourage learners to use the classroom content to solve any real-life issues or apply science in their everyday or link the content to everyday life.	Lerato uses a variety of assessment methods from homework, class activities, to tests with application and analysis questions.

Table 3. 2: Curriculum implementation framework for School B

1. Profile of implementation

Level	Classroom Interaction	Science Practical Work	Science in Society	Assessment
1	Mandla follows the CAPS documents for Physical Science. He uses the prescribed textbook and a few other resources to supplement the textbook. His lesson plans are easily accessible, and he follows them as he had planned. In Mandla's classroom, the learners do not freely interact with each other and ask questions.	Mandla stated that there is no laboratory for the learners to conduct investigation, and there are no laboratory equipment to carry out any investigation. He can do demonstrations.	Mandla stated that he does encourage learners to use the classroom content to solve any real-life issues or apply science in their everyday or link the content to everyday life.	
2				Mandla uses a variety of assessment methods from homework, class activities, to tests with application and analysis questions
3				
4				

Table 3. 3: Curriculum implementation framework for School C

1. Profile of implementation

Level	Classroom Interaction	Science Practical Work	Science in Society	Assessment
1	Sizwe follows the CAPS documents for Physical Science. He uses the prescribed textbook even though the textbooks are not enough for everyone to get a copy.	Sizwe stated that there is no laboratory and no laboratory equipment in their school. As he is in the same school as David, they will use the same method of taking the learners to the university to carry out the investigations.	Sizwe stated that he does not encourage learners to use the classroom content to solve any real-life issues or apply science in their everyday or link the content to everyday life.	Sizwe stated that he uses tests only as a way of assessing his students.
2				
3				
4				

3.5.1. Profile of implementation

The profile of implementation construct provided guidelines on to how teachers can implement the CAPS curriculum. It is concerned with the sub-constructs that influence implementation in the classroom. These sub-constructs are; classroom interaction, the use of science practical work, science incorporation in society, and assessment methods (Rogan and Grayson, 2003). The questionnaire and interviews provided information to produce the findings about profile of implementation. The profile of implementation is used to place teachers at different levels for the different sub-constructs. The four sub-constructs mentioned above will enable the researcher to categorise each teacher. All the teachers are at level one, two, three or four of the above mentioned sub-constructs. This is what the Table 3.1, 3.2 and 3.3 mean. This is further illustrated in Appendix E.

3.5.2. Profile of Capacity to Support Innovation

The profile of capacity to support innovation construct provides information as to how teachers implement the CAPS curriculum. The capacity to support innovation includes such factors as; physical resources, teacher factors, learner factors and the school ecology and management

(Rogan and Grayson, 2003). The questionnaire, and interviews, provided the data to produce the findings regarding profile of implementation. More information regarding personal information of the teachers is in Chapter Four. The profile of capacity to support innovation is used to place teachers at different levels as in the tables above (see, Appendix J).

3.5.3. Profile of Support from Outside agencies

The profile of support from outside agencies is used to place teachers at different levels for the different sub-constructs. The teachers were categorised according to their abilities or states of implementing the curriculum. For example as Table 3.3 shows the teacher is at level 1. Support from outside agencies has an impact on implementation.

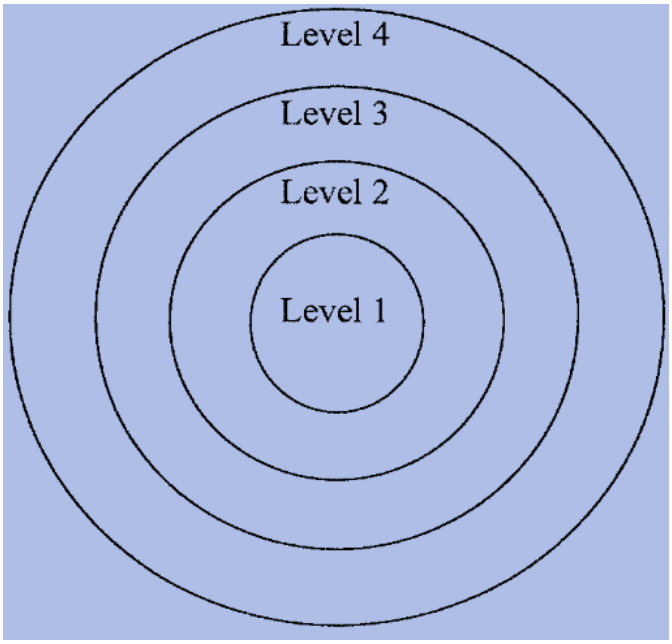


Figure 3. 1: Rogan and Grayson (2003) level boundaries

To be effective, a curriculum implementation approach needs to take into consideration the current level of the constructs (Rogan, 2007). Figure 3.1 shows where each teacher is at currently and where they have to go next on the implementation profile. Each teacher is supposed to know their current zone and what steps to take in order to move to the next zone and eventually achieve level four.

3.6. Ethical consideration

Opie (2006) explained that ethics has to do with the application of moral principles to prevent harmful or wronging others, to promote the good, to be respectful and to be fair. Every research needs to get ethical clearance before any research can be conducted.

The researcher applied for ethics clearance to the University of the Witwatersrand and the Limpopo Department of Education. The ethics approval letters are attached (Appendixes C and D). Before data collection, each participant was informed about the research in writing and permission sought for participation. All participants consented to the study and signed consent forms. It was clearly stated that their names will not be published. Anonymity and confidentiality were assured. Pseudonyms were used (Nolen and Putten, 2007). As stated in the permission letters drafted to the DoBE and to principals, pseudonyms were used for both the study participants and their schools. Nolen and Putten (2007), state that participants should remain anonymous. It was clearly explained to the participants that participation is voluntary and that they could withdraw at any point should they wish to do so. The participants were treated with dignity and respect, and there was no remuneration for participating in the study.

Permission from the Limpopo Department of Education was granted to conduct the research at schools in the Capricorn District. The participants were required to sign consent forms, which stated that their participation in the study is voluntary and that they are aware that they can leave at any time they want (Nolen & Putten, 2007). The participants were not threatened or forced to take part in the study, and the researcher did not publish the names of the study participants. Ethics clearance was granted from the University of the Witwatersrand according to protocol number 2016ECE066M. Permission to conduct research at the various schools was granted by schools' principals and teachers.

3.7. Conclusion

The objectives of this study are to determine the experiences and challenges faced by teachers when implementing CAPS. This chapter explained the research design for this study. The explanation of choosing the qualitative and quantitative design was also discussed. There was a description of the school, participants, and convenient sampling. The questionnaire used was described. The data analysis procedure was explained.

CHAPTER 4

RESULTS AND DISCUSSION

4. Introduction

This chapter presents the findings and discussion of the study. The presentation is organised under the data sources which are the questionnaire and interviews. In doing this, both the teacher challenges and experiences are unravelled. In this effort the study's research questions are answered. These questions are:

1. What experiences of implementing the new South African CAPS Physical Science curriculum do the teachers in the Capricorn District, Limpopo have?
2. What challenges are faced by the Grade 11 teachers in implementing the new South African CAPS Physical Science curriculum?

However, before attending to the research questions some demographic data regarding the respondents is given.

4.1. The biometric data from Section A of the questionnaire

The information gathered from this section of the questionnaire was analysed to get the biographical information of the respondents (see Appendix F, for an example of a filled in research tool). This is summarized in Table 4.1. For ethical reasons, the participants were given pseudonyms (Nolen and Putten, 2007). The pseudonyms were as follows; school A, Lerato, and Tshepo, school B, Mandla and Sputla and school C, Thabang, David and Sizwe. These demographics cover, gender, race, nationality, age range, years of experience, their highest qualification, post-level, the institution of higher learning where they attained their qualifications, number of workshops that they attended in last 6 years related to CAPS implementation, the location of the school and the language of instruction at the school. As the table shows, there was one female participant. All participants are black South Africans. The sampled schools were township schools where English is used as a medium of instruction. The ages of the participants ranged between 20 and 50 years. Their teaching experience ranged from under one year to over thirty years. The teacher with the lowest qualification held a diploma in education. The highest qualified teacher held an Honours degree in education. All

participants reported that they had attended between 1 to 4 workshops focusing on the CAPS implementation.

Table 4. 1: Biographical information of the participants in this study

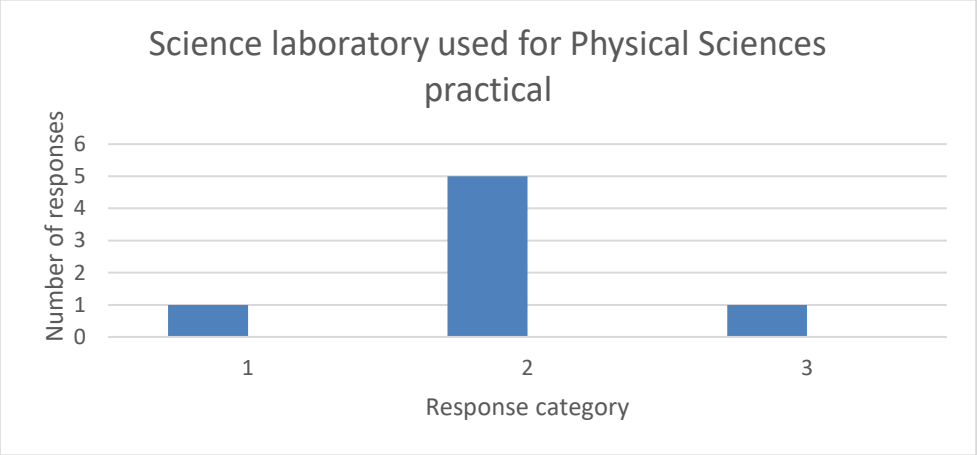
	School A		School B		School C		
	Lerato	Tshepo	Mandla	Sputla	Thabang	David	Sizwe
Gender	Female	Male	Male	Male	Male	Male	Male
Race	Black	Black	Black	Black	Black	Black	Black
Nationality	South African	South African	South African	South African	South African	South African	South African
Age	30-39	50+	40-49	40-49	50+	20-29	40-49
Experience	6-10	31+	21-30	11-20	21-30	0-5	11-20
Highest Qualification	Honours Degree	Honours Degree	Degree	Diploma	Honours Degree	Degree	Degree
Post-level	Teacher	Principal	Deputy	HOD	HOD	Teacher	Teacher
Institution of higher learning	University	University	University	College	University	University	University
No. of Workshops last 6 years	2	3	4	1	1	4	2
School location	Township	Township	Township	Township	Township	Township	Township
Language of instruction	English	English	English	English	English	English	English

4.2. Results from the questionnaire

Results discussed and presented in this section are from the Likert questionnaire (Appendix F for an example of a filled in research tool). The Likert scale used ranged from 1 = Agree, 2 = Disagree, to 3 = Not applicable. The questions asked sought information about availability of laboratories and textbooks, professional development offered by affiliated institutions, assessments, and learners' attitudes to learning at their respective schools. In this study, those who indicated a rating of one agreed with the statement. For example, marking (X) in box 1 on question about availability of laboratory resources meant saying that their science laboratory and Physical Science textbooks, amongst other resources, were available. Those who indicated

a rating of two disagreed with the statement, indicating a lack of availability of Physical Science textbooks and a science laboratory, amongst other resources. Those who indicated a rating of three did not consider the statements to be applicable to their respective schools. In the following paragraphs the results from the Likert questionnaire are presented.

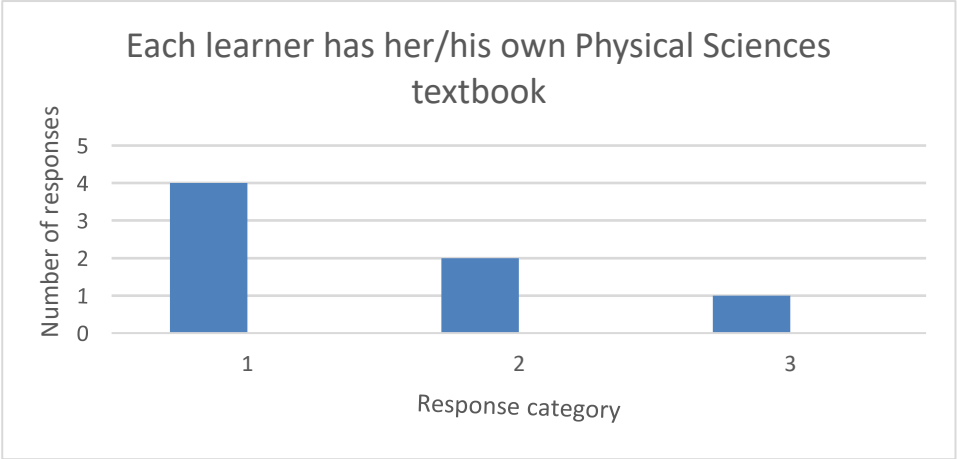
1. **There is a Science laboratory in the schools where you work with the educators that are used for Physical Sciences practical.**



1. Agree 2. Disagree 3. Not applicable

From the bar graph above regarding the availability of a laboratory which can be used for practical work, one participant mentioned that there is a laboratory at the school, five participants mentioned that there is no laboratory and one participant stated that this statement does not apply to their school.

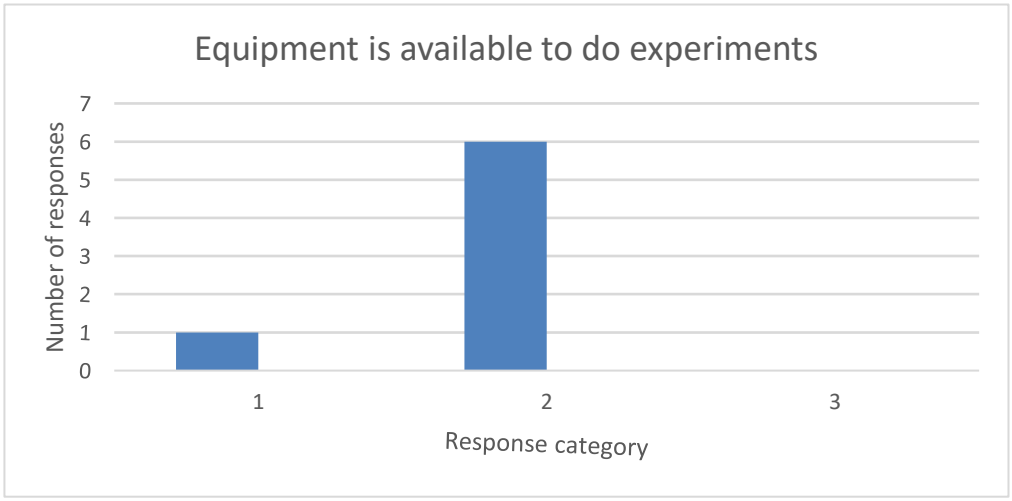
2. **Each learner has his/her own Physical Sciences textbook.**



1. Agree 2. Disagree 3. Not applicable

On the availability of Physical Sciences textbook for each learner, four participants indicated that each learner had a textbook, two participants pointed out that not all learners had their own textbooks at their school and one participant indicated that this statement does not apply to their school.

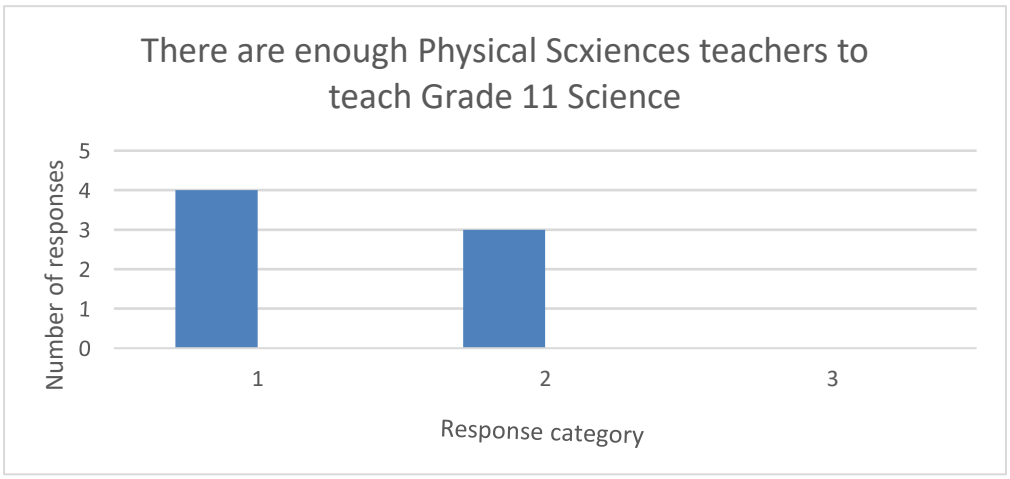
3. There is equipment available to be used to carry out experiments.



1. Agree 2. Disagree 3. Not applicable

Regarding the availability of equipment to be used for experiment, one participant indicated that there is equipment available to do experiments. Six participants mentioned that there is no equipment to do experiments.

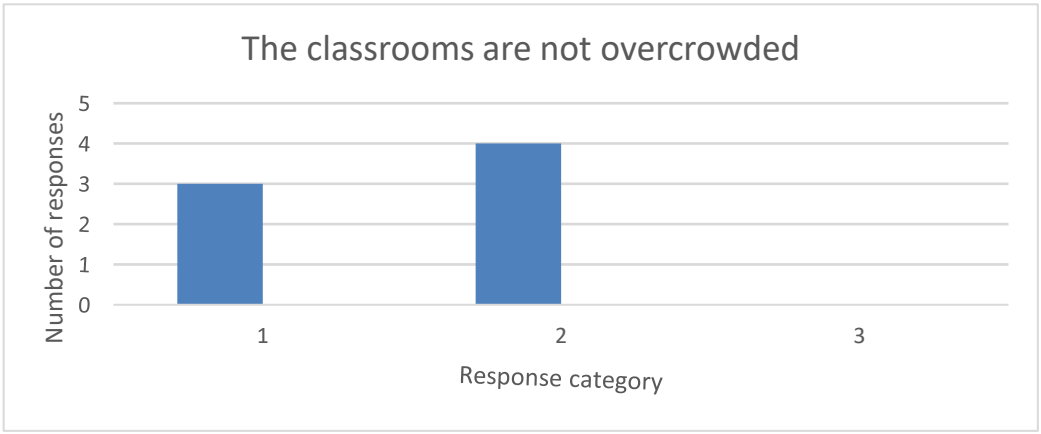
4. There are enough Physical Sciences teachers to teach Physical Sciences Grade 11.



1. Agree 2. Disagree 3. Not applicable

On the availability of Physical Science teachers at the school, four participants indicated that there are enough teachers to teach Physical Science, three participants mentioned that there are not enough teachers to teach Physical Science.

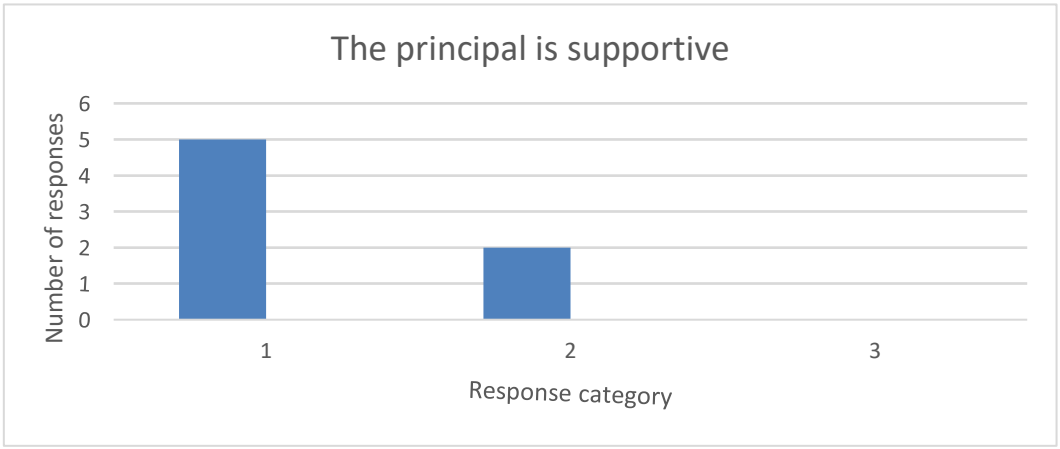
5. The classrooms are not overcrowded.



1. Agree 2. Disagree 3. Not applicable

From the bar graph above about classrooms not being overcrowded at the school, three participants indicated that the classrooms at their school are not overcrowded, four participants mentioned that the classrooms are overcrowded.

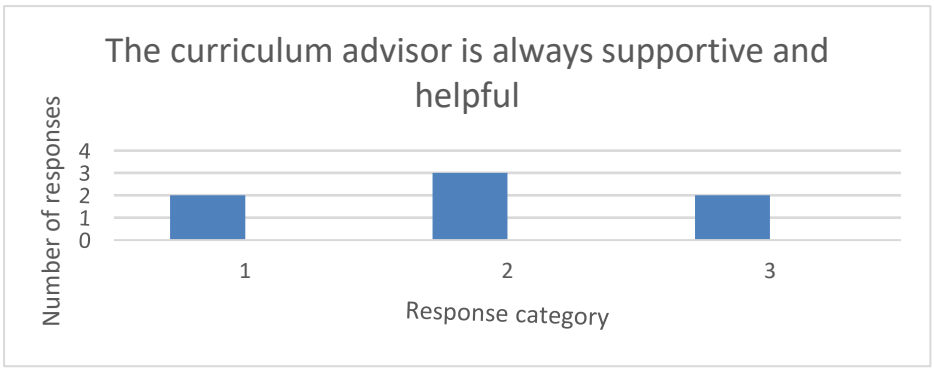
6. The principal is supportive.



1. Agree 2. Disagree 3. Not applicable

Five participants indicated that the principal at their school is supportive; two participants indicated that the principal at their school is not supportive.

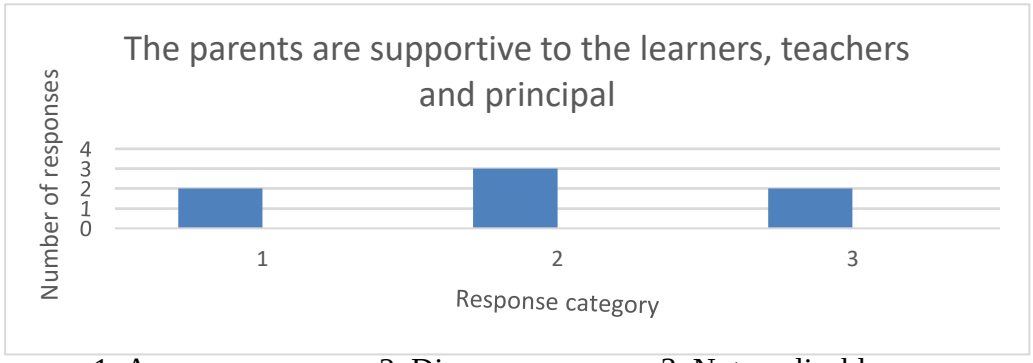
7. The curriculum advisor is always supportive and helpful



1. Agree 2. Disagree 3. Not applicable

Concerning the curriculum advisor always being supportive and helpful to the teacher, two participants indicated that the curriculum advisors are supportive and helpful; three participants indicated that the curriculum advisors were not supportive.

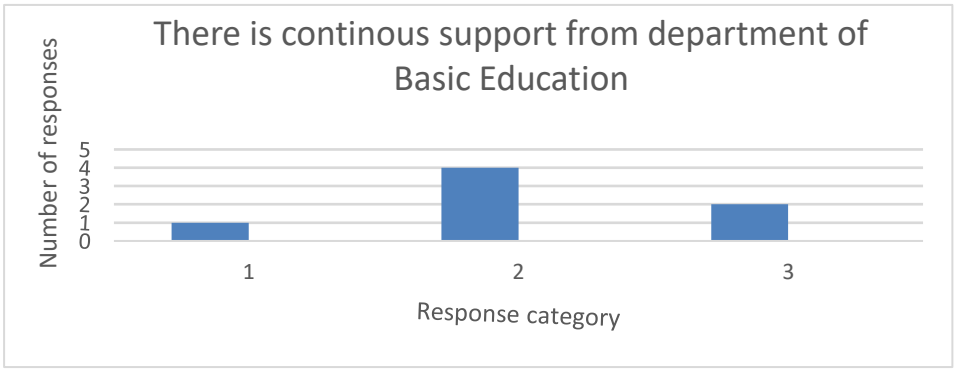
8. The parents support the learners, the principal, and the teachers at the school



1. Agree 2. Disagree 3. Not applicable

Regarding the support learners, teachers and principal receive from the parents, two participants indicated that the parents were supportive; three participants indicated that the parents are not supportive.

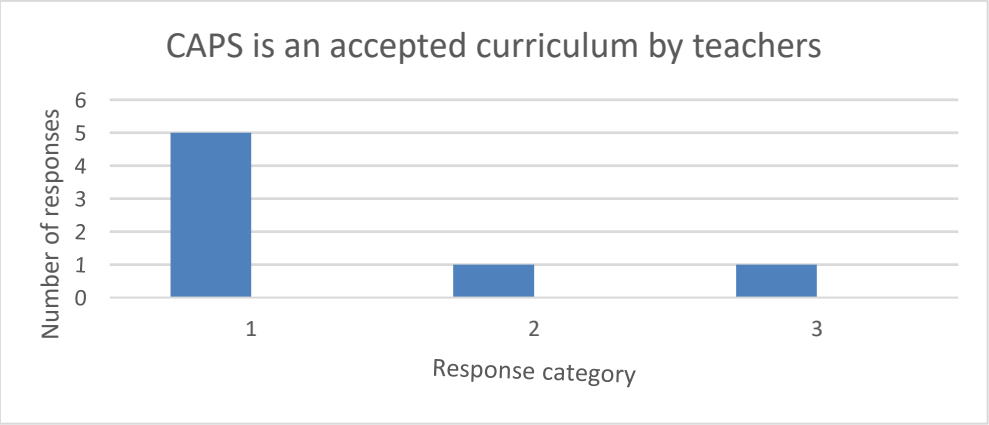
9. There is always a continuous support from Department of Basic Education.



1. Agree 2. Disagree 3. Not applicable

This bar graph above about the support from the department of basic education, one participant indicated that the department of basic education in the province is supportive; four participants indicated that the department of basic education in the province is not supportive and two participants mentioned that this statement does not apply to them.

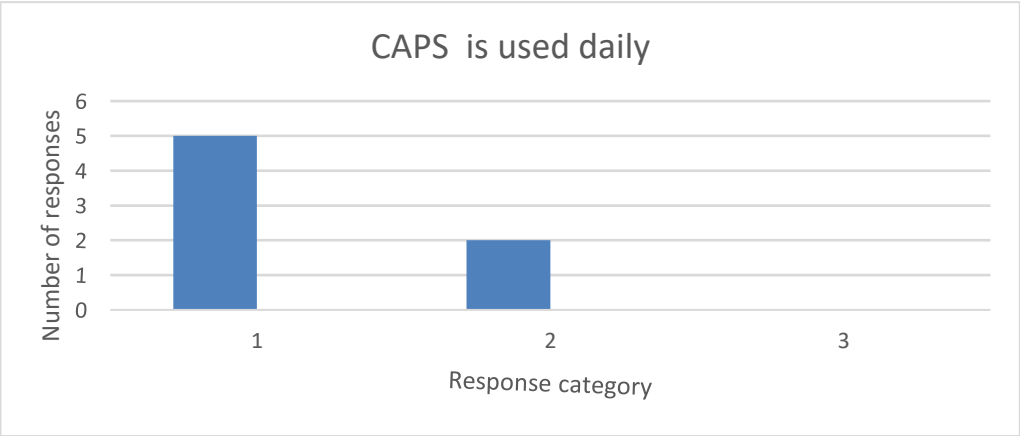
10. The CAPS curriculum is an accepted curriculum by teachers



1. Agree 2. Disagree 3. Not applicable

On the issue of CAPS as an accepted curriculum by teachers, five participants indicated that CAPS is an accepted curriculum by teachers, one participant indicated that CAPS is not an accepted curriculum by teachers and one participant mentioned that this statement does not apply to him/her.

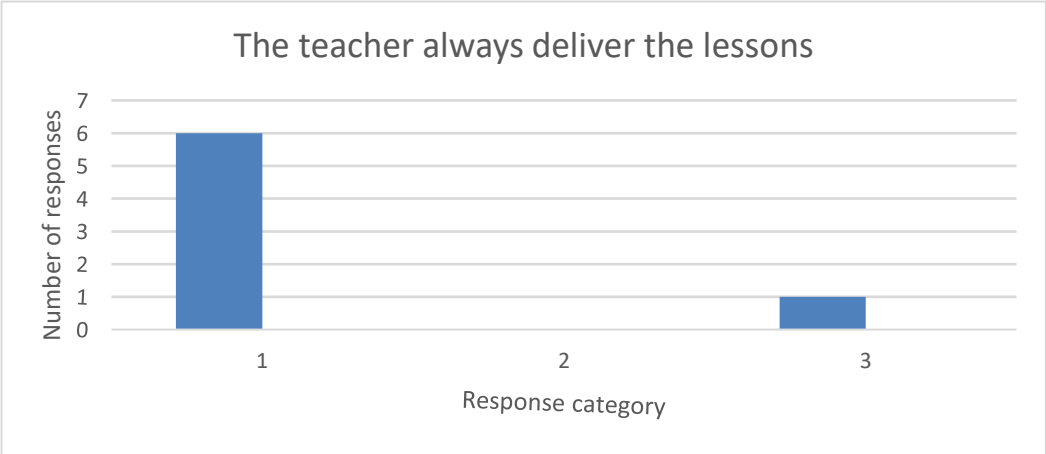
11. You use the CAPS document daily



1. Agree 2. Disagree 3. Not applicable

The bar graph above regarding CAPS being used daily, five participants indicated CAPS is used daily at their school, two participants indicated that CAPS is not used daily.

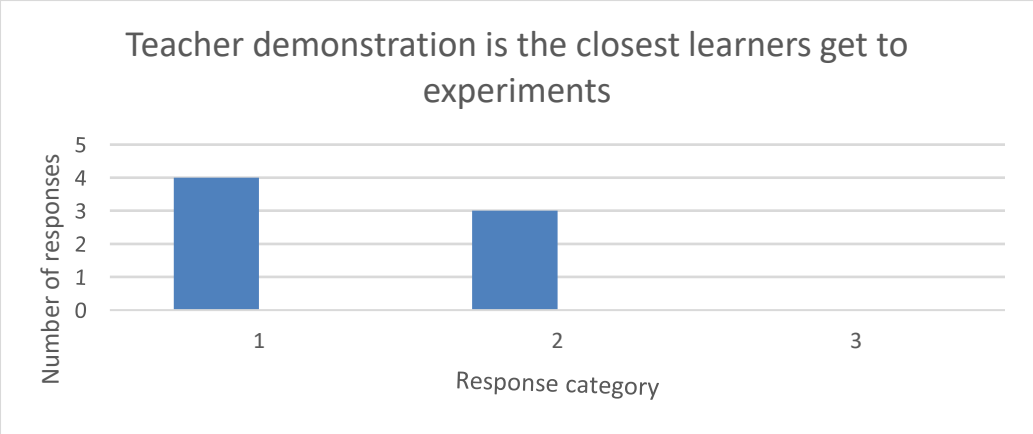
12. The teacher is the one who always deliver the lessons.



1. Agree 2. Disagree 3. Not applicable

From the bar graph above regarding teachers being the ones who always deliver the lessons, six participants indicated that teachers always deliver the lessons and one of the participant mentioned that this statement does not apply to him/her.

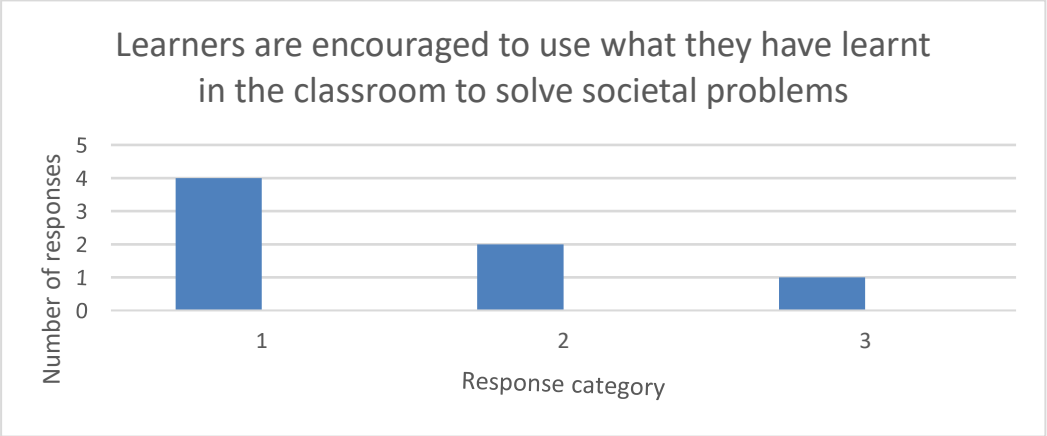
13. There closest to experiments the learners get is only by teacher demonstrations.



1. Agree 2. Disagree 3. Not applicable

The bar graph above regarding the closest learners have been to experiments is teacher demonstration, four participants indicated that the closest learners have been to experiments is teacher demonstration only, three participants indicated that teacher demonstration is not the only way learners have been close to experiments.

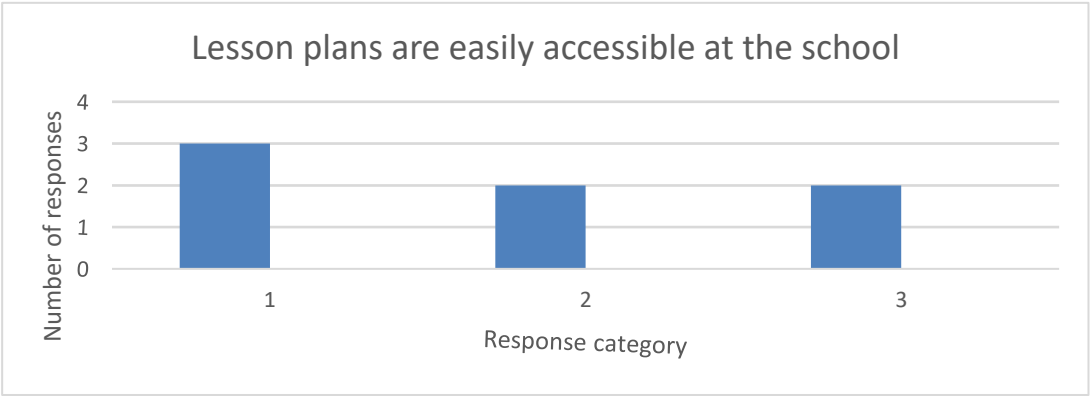
14. Learners are encouraged to use the content they have learnt in the classroom to help solve societal problems (real life issues).



1. Agree 2. Disagree 3. Not applicable

From the bar graph above regarding learners being encouraged to use what they have learnt to solve societal issues, four participants indicated that they encourage their learners to use what they learn in class to solve real life problems, two participants mentioned that they do not encourage their learners to use what they have learnt in class to solve real life issues and one participant mentioned that this statement does not apply to him/her.

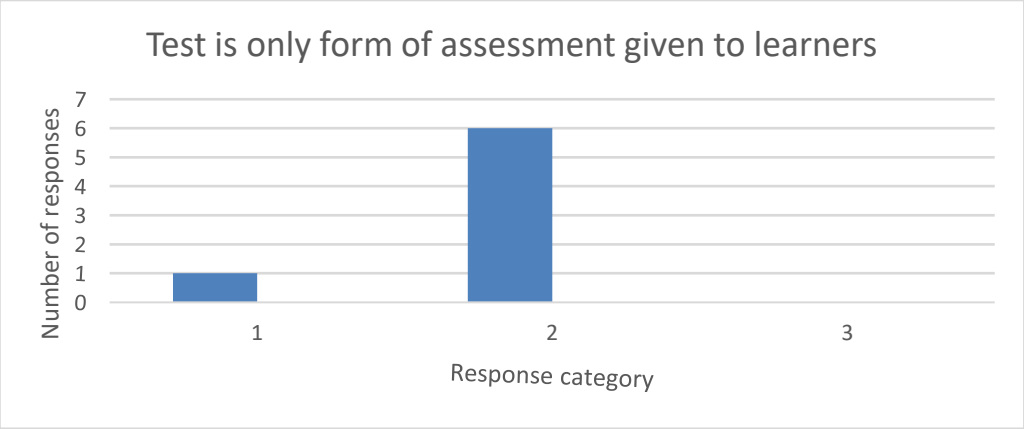
15. The teachers' lesson plans are easily accessible.



1. Agree 2. Disagree 3. Not applicable

This bar graph above about teachers' lesson plans being easily accessible, three participants indicated that their lesson plans are easily accessible, two participants mentioned that their lesson plans are not easily accessible and two participants mentioned that this statement does not apply to them.

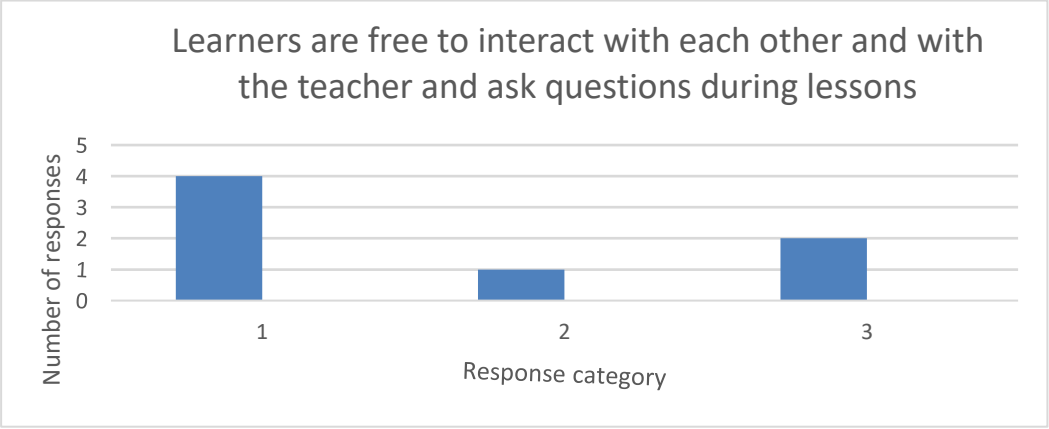
16. The only assessment given to learners is tests only.



1. Agree 2. Disagree 3. Not applicable

From the bar graph above regarding teachers administering tests as the only form of assessment to learners, one participant indicated that the assessment tool that is used is a test, six participants indicated that they use other assessment methods and none of the participant mentioned that this statement does not apply to them.

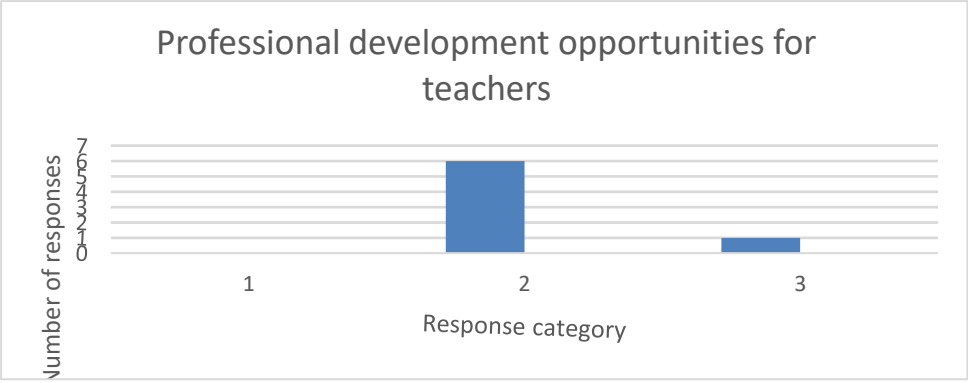
17. The learners interact with each other and with the teacher freely and ask questions during lessons.



1. Agree 2. Disagree 3. Not applicable

The bar graph above regarding learners interacting with each other and with the teacher and ask questions during lessons, four participants indicated that learners in their class are free to ask questions and interact with learners in the classroom, one participant mentioned that learners do not interact with one another and do not ask question in the classroom and none of the participant mentioned that this statement does not apply to them.

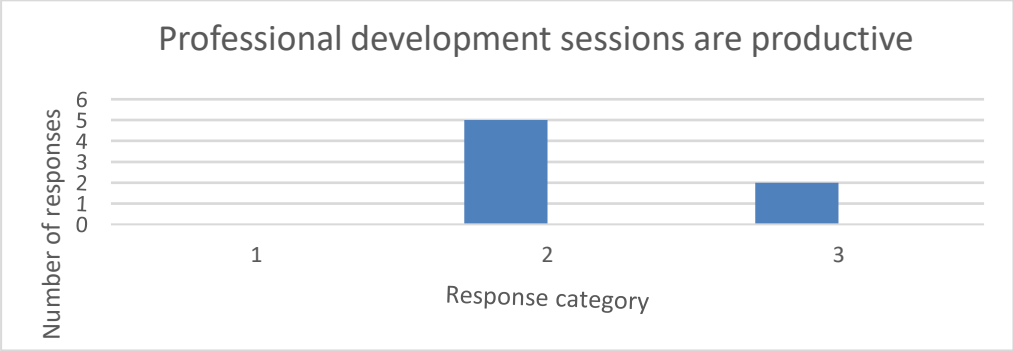
18. There are opportunities for professional development for teachers.



1. Agree 2. Disagree 3. Not applicable

From the bar graph above regarding professional development opportunities for teachers, six of the participants mentioned that there are no professional development opportunities for them and one participants mentioned that this statement does not apply to him/her.

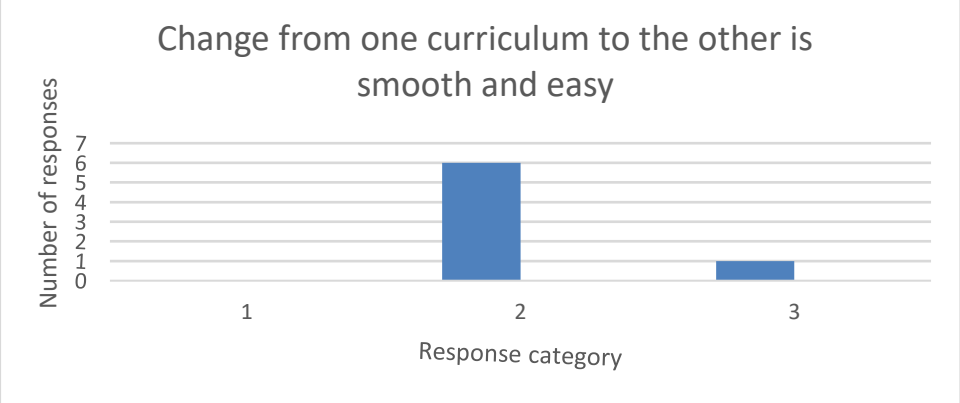
19. The professional development sessions are productive.



1. Agree 2. Disagree 3. Not applicable

The bar graph above regarding professional sessions being productive, five participants mentioned that professional development sessions are not productive and two participants mentioned that this statement does not apply to them.

20. **Change from one curriculum to the other is smooth and easy to follow transaction**.



1. Agree 2. Disagree 3. Not applicable

From the bar graph above regarding change from one curriculum to the other being smooth and easy, six participants mentioned that change from one curriculum to the other is not smooth and not easy to follow and one participant mentioned that this statement does not apply to him/her.

4.3. Results from the interviews

The results show that there are mixed feelings about CAPS, but in general it is a good curriculum policy that is accepted and used by most teachers. This statement was found to be true at most schools where the research was conducted. Some teachers emphasised that CAPS is actually the best approach to education as it encourages learner involvement, and that the content can be used to solve real-life problems. One of the participants said that CAPS is by far the best alternative to serve South African learners, compared to the policies that came before. Some teachers interpreted the curriculum to be outcome-based and considered this a good thing. According to some of the teachers, it is a curriculum that makes learners conversant with daily occurrences, and from that they should be able to draw knowledge. The curriculum also requires learners to engage with the problems around them and to come up with ways to solve them. Some teachers do not like CAPS, and they referred to the policy as a "monster", citing lack of monitoring and support. There are also teachers who do not understand the policy.

One of the questions that the researcher asked in the questionnaire was: *What are your general views on CAPS*? Sputla, supported by Tshepo, said that CAPS is not well implemented, as there was no proper training. Some teachers referred to it as a "monster" due to a lack of monitoring and support, as documented by Bantwini (2010), Maharajh et al. (2016), and Taole (2015). Thabang stated that some teachers do not understand CAPS. This supports the finding of Bantwini (2010) who also found that some teachers in the Eastern Cape did not understand the curriculum they were supposed to implement. Some teachers said that curriculum change is not well planned by the Department of Basic Education (DBE). They elaborated that there is no proper structure to support schools during implementation. This has led some teachers to leave the education system due to the confusion and frustration caused by the lack of support from DBE, and their frustration and lack of understanding of CAPS. The CAPS appears to have been imposed on teachers and learners. For most of the teachers, there are no workshops to attend where they can learn to better implement the curriculum.

Another question that the researcher asked was: *What are your general views on curriculum change?* Tshepo responded to this saying that change was not the problem, but that the main issue was the lack of support. Sputla and Lerato went further and said that transitions must be well managed for positive results. Sputla said that change creates serious inconvenience and confusion in the classroom, as was also reported by Bantwini (2010). This leads to teachers leaving the system. According to one of the heads of a school that participated in this study, teachers generally always have a negative attitude towards any change. According to this school's head, teachers are bound to be negative towards CAPS, but it is the manner in which a leader encourages and supports them through the system that makes a difference. Some teachers are struggling to keep up with the smooth delivery of CAPS due to lack of support, and by resisting change. At times you will find that leaders also have challenges, and thus cannot assist and support their staff when they are most needed. Even though there is lack of resources and a lack of teacher development and training, which hinder the proper implementation of this curriculum, it was said that CAPS represents a change from the traditional way of teaching and learning to a more interactive approach, which is a positive experience.

Another question posed to teachers was: *What are the experiences of teachers with CAPS?* Lerato said that there is a lack of resource supply and that there are no workshops to train teachers to better implement CAPS, which is similar to findings by Bantwini (2010), Rogan (2007), Maharajh et al. (2016), and Taole (2015). David said that it represents a change from the traditional way of teaching and learning, to a more interactive approach. Generally, the teachers are qualified for their positions, as most of them have attained a university degree. The school governing body is involved in the management of the school. Some of the comments were that CAPS is content heavy, with a space to do practical work. All teachers were acquainted with the CAPS document. Experiences of implementing CAPS tie in nicely with the implementation of and capacity to support innovation constructs. The four sub-constructs under implementation are: classroom interaction, science practical work, science in society, and assessment.

Teachers at the various schools face common challenges, and the major challenges that the participants highlighted. Teachers did not receive thorough professional development and training prior to the implementation of the curriculum. Insufficient time was given to training of educators to make them confident in implementing the CAPS. In some cases, there was only

a one to two-hour workshop given by trainers, who were also not sure of what they were doing. Mapotse and Gumbo (2013) suggest that teacher development and empowerment are the main factors that can contribute to successful curriculum implementation. Bantwini (2010) and Taole (2015) reported that a lack of teacher development impacted implementation negatively. Monyane and Selesho (2012) recommended that training analysis and capacity development must be undertaken before a new curriculum is rolled out. There must be a proper system of education in place, and there must be no more crisis management.

The next question asked was: *What recommendations can you offer for the improvement of all or any aspect of the CAPS training and implementation?* Lerato said that the teachers must be taken to multiple workshops, and that schools must be provided with laboratories. Peers et al. (2003) found that inadequate resourcing was one of the factors contributing to lack of proper curriculum implementation. Maluleke (2015) also reiterated lack of resources and inadequate material resources as impediments to curriculum implementation. Alshammari (2013) reported that there are no appropriate teaching tools in schools, and that better textbooks must be offered to learners. Tshepo said that there must be enough time given to training of educators to make them confident in imparting the CAPS lessons in class. Sputla said that the trainers for the workshops must be fully equipped with content and other CAPS-related matters prior to organising workshops for teachers. The duration of the training sessions should be sufficient to allow for an extensive understanding by teachers.

Overcrowded classrooms and lack of science laboratories or classrooms with laboratory apparatus to conduct experiments make it difficult to implement the curriculum. Adler et al. (2003), Maluleke (2015), Mbunyuza-de Heer Manlah (2016), and Taole (2015) reported that lack of resources is a challenge to implementation of the curriculum. A shortage of learning and teaching support materials (LTSMs), and any other resources needed to implement the curriculum, like delivering the exercise books on time, were also cited as challenges. Teachers' lack of knowledge in carrying out practical investigations as well as the unavailability of textbooks which are appropriate for specific grades make it difficult to implement the curriculum.

Other challenges include the involvement of labour unions in disciplining teachers, as unions protect teachers who dare not follow the rules, and that has an impact on implementation. Unions should not behave like equal partners in departments. Parents' involvement was found to be an important factor in disciplining the learners, and checking on their school work and

progress as reported by Taole (2015). Mandla said that labour unions should not behave like equal partners in departments, and that there must be a distinction between employer and employee. He went further to say that there must be an end to politics in education, parents must take responsibility for their children's education, and that there must be a system of education in place. Mandla said that monitoring and support of curriculum implementers should be continuous in order to identify challenges, as well as to develop remedies to such challenges. Teachers should be allocated subjects that they are competent in and that they specialised in at a tertiary level. The department of education should provide all resources needed to facilitate implementation of the curriculum. Another factor is lack of English proficiency. It makes it difficult to implement the curriculum.

The factors described above are the major challenges that teachers are faced with when they implement the CAPS curriculum. These challenges hinder the process of teaching and learning. The challenges vary from person to person and from school to school, but there are common ones, for example: training by experts must be prioritised to ensure proper curriculum implementation, and adequate time must be allocated for it; there must be continuous monitoring and support to ensure proper effective and efficient curriculum implementation; laboratories, apparatus, and other resources must be supplied to support teaching and learning, as well as a reduction of overcrowded classrooms.

4.4. Conclusion

In this chapter the results were presented and discussed in pursuit of answering the research questions, i.e. what experiences the teachers in the Capricorn District, Limpopo have when implementing the new South African CAPS Physical Science curriculum, and what challenges Grade 11 teachers face when implementing the new South African CAPS Physical Science curriculum? The results were presented and analysed for each teacher.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5. Introduction

In the previous chapter, the research findings were presented and analysed. The main points that were highlighted were teachers' experiences of implementing CAPS, and the challenges that come with implementing this curriculum. In Chapter Five, the findings from Chapter four are summarized. Conclusions are made. Experiences and challenges faced by teachers are highlighted. The last part of this chapter will make further recommendations based on the research findings.

5.1. Overview of findings

In this study, the main aims were to determine the experiences that teachers have when implementing the new South African CAPS Physical Science curriculum in the Capricorn District, Limpopo, and to identify some of the challenges faced by Grade 11 Physical Science teachers when implementing the new CAPS Physical Science curriculum. The theoretical framework by Rogan and Grayson (2003) guided the gathering, analysis, and interpretation of data, using constructs and sub-constructs.

The research questions for this study were:

1. What experiences of implementing the new South African CAPS Physical Science curriculum do the teachers in the Capricorn District, Limpopo have?
2. What are the challenges faced by the Grade 11 teachers when implementing the new South African CAPS Physical Science curriculum?

The data was analysed according to the Rogan and Grayson curriculum implementation framework. The framework made it possible to classify each teacher to a certain level according to the factors which support CAPS curriculum implementation in Grade eleven. As mentioned in Chapter Two, the factors are; assessment, science in society, science practical work and classroom interaction.

Lerato in School A was classified to be at level one regarding classroom interaction and science practical work. She follows the CAPS documents for Physical Science. She uses the prescribed textbook which she finds not to be entirely useful to use in her classroom. Learners can freely ask questions in Lerato's classroom even though it's not all of them. She uses classroom demonstrations to help develop concepts as there are no apparatus that the learners can use to carry out the practical on their own. There is no laboratory for the learners to conduct investigation, and there is no laboratory equipment to carry out any investigation. She was classified to be at level two regarding science in society and assessment. She does encourage learners to use the classroom content to solve any real life issues or apply science in their everyday or link the content to everyday life. She uses a variety of assessment methods from homework, class activities, to tests with application and analysis questions.

Mandla in School B was classified to be at level one in three factors except assessment. He follows the CAPS documents for Physical Science. He uses the prescribed textbook and a few other resources to supplement the textbook. In Mandla's classroom, the learners do not freely interact with each other and ask questions. He stated that there is no laboratory for the learners to conduct investigation, and there is no laboratory equipment to carry out any investigation. He can do demonstrations. Mandla indicated that he does encourage learners to use the classroom content to solve any real life issues or apply science in their everyday or link the content to everyday life. He uses a variety of assessment methods from homework, class activities, to tests with application and analysis questions.

David in School C was classified to be at level one in three factors except assessment. He follows the CAPS documents for Physical Science. He uses the prescribed textbook and a few other resources to supplement the textbook. Learners in David's classroom can freely ask questions even though it's not all of them. There is no laboratory and no laboratory equipment in their school. He can carry out a demonstration whenever he can. He has an agreement with one of the universities that is not too far from the school to allow learners to carry out the investigations in the prescribed curriculum document. He encourages learners to use the classroom content to solve any real life issues or apply science in their everyday or link the content to everyday life. He uses a variety of assessment methods from homework, class activities, to tests with application and analysis questions.

Sizwe in School C was classified to be at level one in all four factors. He follows the CAPS documents for Physical Science. He uses the prescribed textbook even though the textbooks are not enough for everyone to get a copy. There is no laboratory and no laboratory equipment in their school. As he is in the same school as David, they will use the same method of taking the learners to the university to carry out investigations. He stated that he does not encourage learners to use the classroom content to solve any real life issues or apply science in their everyday or link the content to everyday life. He uses tests only as a way of assessing his students.

Using the Rogan and Grayson (2003) framework, further analysis regarding physical resources, teacher factors, learner factors and school ethos and management, was done.

Lerato is placed in level one for physical resources. There are basic buildings like classrooms and one office in School A, but not all of them are in good condition. There are prefabricated classrooms and one of them is used as a staff room. There is an old room that is also used as a staff room. Toilets are available for both teachers and learners to use. Some textbooks are available but not enough for all the students. The school has no science laboratories or any other room to accommodate learners when they engage in practical work. Classrooms are electrified except for the prefabricated ones and one of the prefabs is used as a staff room. The school is fenced and there is no security guard but a security guard house. There is a gentleman who helps in keeping the school landscape neat and clean. The learners who are part of the learners' representative council act as security guards during breaks to stop learners from leaving school. There are trees providing shade for learners during break. There is suitable furniture in the classrooms. There is a printing machine that can make photocopied that the school uses. There is running water. There is a bare dusty field that is used as a sports grounds and a Physical Education (PE) field.

Mandla was placed at level one for physical resources and school ecology and management. There are basic buildings in School B, like classrooms and a building for the principal's office, deputy- principal's office and a staff room are available although the condition is not satisfactory. Textbooks are available and they are enough for all the students. The school has no science laboratories or any other room to accommodate learners when they engage in practical work. Classrooms are electrified and the offices and staff room are also electrified. The school is fenced and there is no security guard. There are trees although some of them are

not growing well. There is suitable furniture in the classrooms. There is a printing machine that can make photocopied that the school uses. There is running water. There is a bare field that is used as a sports grounds and a Physical Education (PE) field. The principal was not visible when the researcher went to collect data. Mandla, took the responsibility of the principal that day. As the deputy, he has a teaching load. Teachers and learners play an active role in school management especially when it comes to disciplining the learners and encouraging them to stay at school and work hard. Teaching and learning occur most of the time. Parents play active role in School Governing Bodies but not always in supporting the school in general. Some teachers always come late and when the principal enforce the rules, the unions protect those teachers. There are teachers who break the rules and the principal is finding it hard to reprimand them. School is secure and there is a strong room to keep safe essential materials. Access is controlled and is denied to unauthorized personnel even though there is no security at the gate.

David and Sizwe were placed at level two for both physical resources and learner factor. There are adequate basic buildings in School C with one office in good condition. Suitable furniture is available and it is adequate and in good condition. There is a prefab classroom that is used as a staff room by other teachers. Toilets are available. Textbooks are available and they are enough for all the students. The school has no science laboratories or any other room to accommodate learners when they engage in practical work. Classrooms are electrified. The school is fenced and there is security guard. There are trees. There is suitable furniture in the classrooms. There is a printing machine that can make photocopied that the school uses. There is running water. There is a bare dusty field that is used as a sports ground. Learners have some proficiency in the language of instruction. Learners attend school regularly. Learners are well nourished as they are fed at the school. Learners are given adequate time away from home responsibilities to do school work. They all came from different social backgrounds. Attendance is good.

Using the Rogan and Grayson framework, further analysis regarding types of encouragement and support looking at physical resources, design of professional development, direct support to learners, dominant change force evoked by agency and monitoring mechanisms and accountability. Lerato is placed to be at level two in all factors except for dominant change force evoked by agency. There are buildings, curriculum materials, exercise books, textbooks, chalk, duster, printer, cartridge, and computer as mentioned. Typical mode is a series of short workshops lasting for one year. Basic academic needs are catered for in the form of extra

lessons as Lerato offers Saturday classes. Inspections are commenced in collaboration with school-based personnel.

5.1.1. Teachers' experiences when implementing the new South African Curriculum and Assessment Policy Statements for the Physical Science curriculum

The first question of this research was; what experiences of implementing the new South African CAPS Physical Science curriculum do the teachers in the Capricorn District, Limpopo have? From analysing the data using the Rogan and Grayson rubrics, it appears that teachers have different experiences implementing the new CAPS curriculum. From the findings, these experiences impacted proper curriculum implementation at various schools. Lack of professional development and training as well as lack of monitoring and support from both management and the department of basic education were identified as some of the shortcomings for proper CAPS implementation. Sputla indicated that CAPS is not well implemented as there was no proper training, and some teachers refer to CAPS as a "monster", as there is a lack of monitoring and support. Thabang added on to say due to lack of training, CAPS is not understood by some teachers.

5.1.2. Challenges faced by the Grade 11 Physical Science teachers in implementing the new South African Curriculum and Assessment Policy Statements for the Physical Science curriculum

The second question was, what are the challenges faced by the Grade 11 teachers when implementing the new South African CAPS Physical Science curriculum? Although CAPS is said to be the best approach to education, there are still challenges faced by teachers when implementing the curriculum. After analysing the research data, it was found that lack of resources (including teachers, science laboratory, science equipment, books, library, proper classrooms, student computers, properly maintained sports grounds), overcrowded classrooms, insufficient time for curriculum training and most of the learners have some proficiency in English as the medium of instruction.

5.2. Implications and recommendations

Rogan and Grayson (2003) explained the hypothesised inter-relationships between the three constructs. These are outlined in Chapter Two. They will help teachers to be able to move from one level to the next. There is no way that teachers can be effective and efficient in their implementation without proper training and resources, but the hope is that they will gradually move to Level four with their implementation. This is a small case study, but it might happen that other teachers in different parts of South Africa can relate to the findings of this study.

Where there is no science laboratory, teachers can borrow equipment from other schools or academic institutions for demonstration purposes with the help of the learners. The teacher must take them through step-by-step instructions to lead them to designing their own investigations. They can partner with another school to allow learners to carry out investigations on their own, and to collect and analyse data on their own or in groups. For research purposes, a researcher can do observations for a number of days to see how the teacher interacts with learners and how learners interact with each other during any demonstration, and determine how that affects the attitude of learners and their understanding of the content.

Management bodies must plan, with the input of teachers, how money will be spent on building a laboratory. The teachers can ask for help from outside agencies, which can provide laboratory equipment or other supplies. The other buildings must be in good condition. The next project will be a library or space where learners can use the internet to access information for research purposes, and access books that will help with research or homework. There must be adequate supply of charts, chalks, dusters, and other resources that are required on a daily basis. There must be a good sports field that is taken care of by the community or by the learners themselves. A good copy centre that can run more copies in a day would be advantageous. For research purposes, a researcher can do observations for a number of days to see how the project of building and sourcing resources is coming together.

It would be beneficial to the teachers if the department of basic education could create opportunities for professional development. The workshops should be well structured with knowledgeable instructors. The workshops should be delivered after school hours so as to not disrupt lessons. The workshops should be effective and productive so as to empower teachers for appropriate curriculum implementation. These opportunities should be held on regular basis

as a way of supporting teachers. This will also give opportunities regular teacher support and monitoring effective curriculum implementation.

Overcrowded classrooms could be avoided by expending schools, and hiring more qualified teachers. If more learners are in one classroom, there will be restrictions with regards to exploring various teaching and learning methods. Most of the time overcrowded classrooms are mostly out of control and teaching and learning is affected.

It is recommended that the department of Basic education should staff develop teachers so as to enable them to handle the new curriculum. Teacher training institutions should also design and implement curricula, which enable teachers to comfortably handle the challenges associated with the new curriculum.

5.3. Recommendations for further research

For further research efforts, more time should be spent on collecting data. It would be good to investigate a school's teaching, learning, assessment, management, and monitoring policies, and link all of these to the Rogan and Grayson (2003) framework. This will enable a study to ascertain what is supposed to be happening at schools and determine what level they are currently operating at. Working together, a researcher and a school can determine how to move teachers from where they are to where they are supposed to be, i.e. Level four of the Rogan and Grayson (2003) framework. The best place to start would be with the same participants that were used for this research.

5.4. Limitations of this study

For this study, an in-service teacher development workshop with participants would have helped them operate at higher levels. It would have been advantageous to involve experts when delivering workshops to the participants. The researcher could have included classroom observation as a research tool. The researcher must also take teacher beliefs, intentions, attitudes, and values into consideration when conducting research.

5.5. Conclusion

The aims of this study, as stated in Chapter one, were to determine the experiences that teachers have when implementing the new South African CAPS Physical Science curriculum in the

Capricorn District, Limpopo, and to identify some of the challenges faced by Grade 11 Physical Science teachers in implementing the new CAPS Physical Science curriculum. The main motivation for this study was to determine the influence that teachers' understandings and interpretations of curricula have on proper implementation thereof. The experiences and challenges found by other researchers were also stated. The framework by Rogan and Grayson (2003) anchored this study. This informed the data analysis and helped answer the research questions that were stated in Chapter one by employing the constructs and the sub-constructs of the Rogan and Grayson (2003) framework.

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APPENDIX A: TEACHER INTERVIEW QUESTIONNAIRE

QUESTIONNAIRE COVER PAGE

Grade 11 Physical Science teachers' experiences of implementing the new CAPS curriculum: a case study of Capricorn District, Limpopo, South Africa.

QUESTIONNAIRE

Dear Sir/Madam

The aim of the questionnaire is to determine the experiences that teachers have of implementing the new South African CAPS Physical Science curriculum in the Capricorn District, Limpopo and to identify the challenges faced by the Grade 11 teachers in implementing the new South African CAPS Physical Science curriculum.

The results of this study will be used as suggestions to the curriculum policy makers to use them when they develop curriculum and for teachers, principals and curriculum advisors to use when they are implementing curriculum policy in their schools.

Your participation in the study will be greatly appreciated.

Participation in the study is strictly voluntarily and the information collected will be kept confidential and you will always remain anonymous.

INFORMATION REGARDING THE QUESTIONNAIRE:

1. Kindly respond to all questions.
2. The questionnaire is comprised of three sections
3. Please answer all the sections as fully as possible.
4. Please select only one option.
5. Section A to section C.
6. Section C is an open–ended question where the respondent can indicate his/her own point of view.

Thank you for your participation.

RESPONDENT NUMBER (FOR OFFICE USE ONLY)

SECTION A: BIOGRAPHICAL INFORMATION

Complete the single variable scale below to complete your biography information.

Kindly complete the requested information by marking the appropriate box with an X: e.g. | **X** |

Gender:

Female	1	
Male	2	

Race:

Black	1	
Coloured	2	
Indian	3	
White	4	

Nationality:

South African	1	
Non-South African	2	

Age:

20-29 years	1	
30-39 years	2	
40-49 years	3	
50+ years	4	

Experience:

0-5 years	1	
6-10 years	2	
11-20 years	3	

21-30 years	4	
31+ years	5	

Highest qualification

Certificate	1	
Diploma	2	
Degree	3	
Honours Degree	4	
Masters Degree	5	
Phd Degree	6	

Post-level:

Teacher	1	
HOD	2	
Deputy-Principal	3	
Principal	4	

Institution of higher learning where you received your highest qualification:

College	1	
University of technology	2	
University	3	

Work load (number of periods per week):

0-15	1	
16-25	2	

26-35	3	
36-45	4	
46+	5	

Number of CAPS workshops attended over the last six (6) years:

0	1	
1	2	
2	3	
3	4	
4	5	

School location:

Town/City	1	
Township	2	
Village	3	

Language of Instruction:

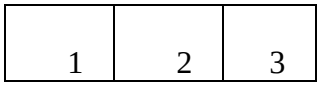
Afrikaans	1	
English	2	
Sepedi	3	

SECTION B: ORDINARY QUESTIONS

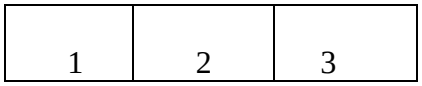
The following questions use a scale ranging from agree to not applicable. (1= agree, 2=disagree, 3= not applicable).

Kindly complete the requested information by marking the appropriate box with an X.

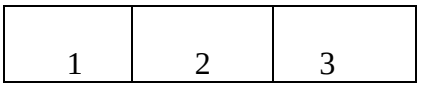
1. There is a Science laboratory in our school that we use for Physical Sciences practical.



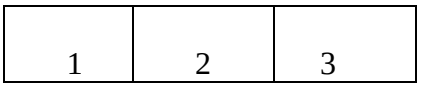
2. Each learner has his/her own Physical Sciences textbook.



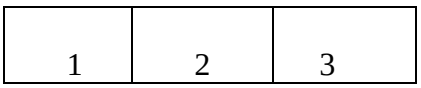
3. There are equipment available to be used to carry out experiments.



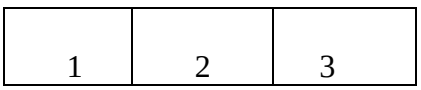
4. There are enough Physical Sciences teachers to teach Physical Sciences Grade 11.



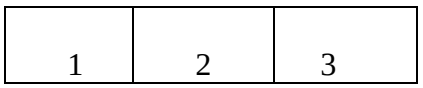
5. The classrooms are not overcrowded.



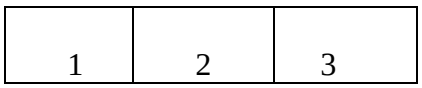
6. The principal is supportive.



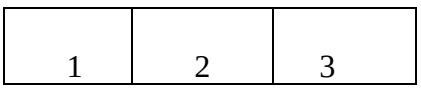
7. The curriculum advisor is always supportive and helpful.



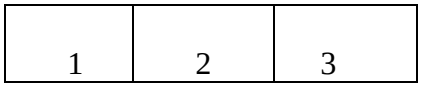
8. The parents support the learners, the principal, and the teachers at the school.



9. There is always a continuous support from Department of Basic Education.



10. The CAPS curriculum is an accepted curriculum by teachers.



11. You use the CAPS document daily.

1	2	3

12. The teacher is the one who always deliver the lessons.

1	2	3

13. The closest to experiments the learners get is only by teacher demonstrations.

1	2	3

14. Learners are encouraged to use the content they have learnt in the classroom to help solve societal problems (real life issues).

1	2	3

15. My lesson plans are easily accessible.

1	2	3

16. The only assessment I give to my learners is tests only.

1	2	3

17. The learners interact with each other and with the teacher freely and ask questions during lessons.

1	2	3

18. There are opportunities for professional development for teachers.

1	2	3

19. The professional development sessions are productive.

1	2	3

20. Change from one curriculum to the other is smooth and easy to follow transaction.

1	2	3

Section C: OPEN-ENDED QUESTIONS

1. Which challenges are you experiencing when implementing CAPS, if any at all?

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2. What are your general views on CAPS and curriculum change?

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3. What are the experiences of teachers with CAPS?

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4. What are the advantages of CAPS?

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5. What are the disadvantages of CAPS?

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6. What are your views on teacher training in the CAPS?

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7. How were you introduced to the CAPS?

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8. What are the improvements brought by CAPS on Teaching and Learning?

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9. What are the experiences of teachers on Teacher Training with regard to venue, duration, knowledge of trainers, availability of resources, feedback and support of the Department of Basic Education?

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10. What is the impact of CAPS on teaching with regard to the availability of resources?

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11. How are your problems being addressed by school management?

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12. What recommendations can you offer for the improvement of all or any aspect of the CAPS training, and implementation?

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APPENDIX B: HEAD OF DEPARTMENT (HOD) AND/OR PRINCIPAL INTERVIEW QUESTIONNAIRE

QUESTIONNAIRE COVER PAGE

Grade 11 Physical Science teachers' experiences of implementing the new CAPS curriculum: a case study of Capricorn District, Limpopo, South Africa.

QUESTIONNAIRE

Dear Sir/Madam

The aim of the questionnaire is to determine the experiences that teachers have of implementing the new South African CAPS Physical Science curriculum in the Capricorn District, Limpopo and to identify the challenges faced by the Grade 11 teachers in implementing the new South African CAPS Physical Science curriculum.
The results of this study will be used as suggestions to the curriculum policy makers to use them when they develop curriculum and for teachers, principals and curriculum advisors to use when they are implementing curriculum policy in their schools.

Your participation in the study will be greatly appreciated.

Participation in the study is strictly voluntarily and the information collected will be kept confidential and you will always remain anonymous.

INFORMATION REGARDING THE QUESTIONNAIRE:

7. Kindly respond to all questions.
8. The questionnaire is comprised of three sections
9. Please answer all the sections as fully as possible.
10. Please select only one option.
11. Section A to section C.
12. Section C is an open–ended question where the respondent can indicate his/her own point of view.

Thank you for your participation.

RESPONDENT NUMBER (FOR OFFICE USE ONLY)

SECTION A: BIOGRAPHICAL INFORMATION

Complete the single variable scale below to complete your biography information.

Kindly complete the requested information by marking the appropriate box with an X: e.g. **X**

Gender:

Female	1	

Male	2	

Race:

Black	1	
Coloured	2	
Indian	3	
White	4	

Nationality:

South African	1	
Non-South African	2	

Age:

20-29 years	1	
30-39 years	2	
40-49 years	3	
50+ years	4	

Experience:

0-5 years	1	
6-10 years	2	
11-20 years	3	

21-30 years	4	
31+ years	5	

Highest qualification

Certificate	1	
Diploma	2	
Degree	3	
Honours Degree	4	
Masters Degree	5	
Phd Degree	6	

Post-level:

Teacher	1	
HOD	2	
Deputy-Principal	3	
Principal	4	

Institution of higher learning where you received your highest qualification:

College	1	
University of technology	2	
University	3	

Work load (number of periods per week):

0-15	1	
16-25	2	

26-35	3	
36-45	4	
46+	5	

Number of CAPS workshops attended over the last six (6) years:

0	1	
1	2	
2	3	
3	4	
4	5	

School location:

Town/City	1	
Township	2	
Village	3	

Language of Instruction:

Afrikaans	1	
English	2	
Sepedi	3	

SECTION B: ORDINARY QUESTIONS

The following questions use a scale ranging from agree to not applicable. (1= agree, 2=disagree, 3= not applicable).

Kindly complete the requested information by marking the appropriate box with an X.

1. There is a Science laboratory in our school that we use for Physical Sciences practical.

1	2	3

2. Each learner has his/her own Physical Sciences textbook.

1	2	3

3. There are equipment available to be used to carry out experiments.

1	2	3

4. There are enough Physical Sciences teachers to teach Physical Sciences Grade 11.

1	2	3

5. The classrooms are not overcrowded.

1	2	3

6. You are supportive.

1	2	3

7. The curriculum advisor is always supportive and helpful.

1	2	3

8. The parents support the learners, the principal, and the teachers at the school

1	2	3

9. There is always a continuous support from Department of Basic Education.

1	2	3

10. The CAPS curriculum is an accepted curriculum by teachers.

1	2	3

11. The CAPS document is used daily at your school.

1	2	3

12. The teacher is the one who always deliver the lessons.

1	2	3

13. There closest to experiments the learners get is only by teacher demonstrations.

1	2	3

14. Learners are encouraged to use the content they have learnt in the classroom to help solve societal problems (real life issues).

1	2	3

15. Lesson plans at your school are easily accessible.

1	2	3

16. The only assessment given to learners is tests only.

1	2	3

17. The learners interact with each other and with the teacher freely and ask questions during lessons.

1	2	3

18. There are opportunities for professional development for teachers.

1	2	3

19. The professional development sessions are productive.

1	2	3

20. Change from one curriculum to the other is smooth and easy to follow transaction.

1	2	3

Section C: OPEN-ENDED QUESTIONS

1. Which challenges are you experiencing when implementing CAPS, if any at all?

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2. What are your general views on CAPS?

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3. What are your general views on curriculum change?

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4. What are the experiences of leadership with CAPS?

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5. What are the advantages of CAPS?

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6. What are the disadvantages of CAPS?

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7. What are your views on teacher training and leadership training on the CAPS?

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8. How were the teachers and leadership introduced to the CAPS?

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9. What are the improvements brought by CAPS on Teaching and Learning?

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10. What are the experiences of teachers on Teacher Training with regard to venue, duration, knowledge of trainers, availability of resources, feedback and support of the Department of Basic Education?

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11. What is the impact of CAPS on teaching with regard to the availability of resources?

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12. How do you address problems as the school management?

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13. What recommendations can you offer for the improvement of all or any aspect of the CAPS training, and implementation?

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14. Which assessment, evaluation and monitoring tools are in place for the management of CAPS?

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15. Which challenges are you experiencing when implementing CAPS?

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16. Why is enhancing educators' knowledge, skills and attitudes of great importance for the principal?

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17. As a school how can you make sure that everything in the classrooms is beneficial to the learners?

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APPENDIX C: PERMISSION LETTER FROM UNIVERSITY OF THE WITWATERSRAND

Wits School of Education

27 St Andrews Road, Parktown, Johannesburg, 2193 Private Bag 3, Wits 2050, South Africa. Tel: +27 11 717-3064 Fax: +27 11 717-3100 E-mail: enquiries@educ.wits.ac.za Website: www.wits.ac.za

06 December 2016

Student Number: 1242643

Protocol Number: 2016ECE055M

Dear Joyce Phooko

Application for ethics clearance: Master of Education

Thank you very much for your ethics application. The Ethics Committee in Education of the Faculty of Humanities, acting on behalf of the Senate, has considered your application for ethics clearance for your proposal entitled:

Grade 11 Physical Science teachers' experiences of implementing the new CAPS curriculum: a case study of Capricorn District, Limpopo, South Africa

The committee recently met and I am pleased to inform you that clearance was granted.

Please use the above protocol number in all correspondence to the relevant research parties (schools, parents, learners etc.) and include it in your research report or project on the title page.

The Protocol Number above should be submitted to the Graduate Studies in Education Committee upon submission of your final research report.

All the best with your research project.

Yours sincerely,

M Mabela

Wits School of Education

011 717-3416

cc Supervisor - Prof Elaosi Vhurumuku

APPENDIX D: PERMISSION LETTER FROM LIMPOPO DEPARTMENT OF EDUCATION

LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

Ref: 2/2/2 Enq: MC Makola PhD Tel No: 015 290 9448 E-mail:MakolaMC@edu.limpopo.gov.za

Motshenya JP
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RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH

1. The above bears reference.
2. The Department wishes to inform you that your request to conduct research has been approved. Topic of the research proposal: **"GRADE 11 PHYSICAL SCIENCE TEACHERS EXPERIENCE OF IMPLEMENTING THE NEW CAPS CURRICULUM: A CASE STUDY OF CAPRICORN DISTRICT, LIMPOPO SOUTH AFRICA".**
3. The following conditions should be considered:

3.1 The research should not have any financial implications for Limpopo Department of Education.

3.2 Arrangements should be made with the Circuit Office and the schools concerned.

3.3 The conduct of research should not anyhow disrupt the academic programs at the schools.

3.4 The research should not be conducted during the time of Examinations especially the fourth term.

REQUEST FOR PERMISSION TO CONDUCT RESEARCH: MOTSHENYA JP

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Tel: 015 290 7600, Fax: 015 297 6920/4220/4494

The heartland of southern Africa - development is about people!

3.5 During the study, applicable research ethics should be adhered to; in particular the principle of voluntary participation (the people involved should be respected).

3.6 Upon completion of research study, the researcher shall share the final product of the research with the Department.

4 Furthermore, you are expected to produce this letter at Schools/ Offices where you intend conducting your research as an evidence that you are permitted to conduct the research.

5 The department appreciates the contribution that you wish to make and wishes you success in your investigation.

Best wishes.



12/01/17

Ms NB Mutheiwana
Head of Department

Date

REQUEST FOR PERMISSION TO CONDUCT RESEARCH: MOTSHENYA JP

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APPENDIX E: ROGAN AND GRAYSON CURRICULUM IMPLEMENTATION FRAMEWORK RUBRICS FOR THE FOUR TEACHERS

Table 1: Rogan and Grayson (2003) curriculum implementation framework, SCHOOL A (Lerato supported by Tshepo)

1. Profile of implementation

Level	Classroom Interaction	Science Practical Work	Science in Society	Assessment
1	Lerato follows the CAPS documents for Physical Science. She uses the prescribed textbook which she finds not to be entirely useful to use in her classroom. She presents science content in a well organised, correct and well sequenced manner, based on a well-designed lesson plan. Provides adequate notes for the learners to use when studying. Her lesson plans are easily accessible and she follows them as she had planned. She poses questions to learners and they sometimes give her answers and other times they are not really interested in what she is teaching. Learners can freely ask questions in Lerato's classroom even though it's not all of them or some of them might not be relevant to the work at hand.	Lerato uses classroom demonstrations to help develop concepts as there are no apparatus that the learners can use to carry out the practical on their own. There is no laboratory for the learners to conduct investigation, and there is no laboratory equipment to carry out any investigation.		
2			Lerato stated that she does encourage learners to use the classroom content to solve any real life issues or apply science in their everyday or link the content to everyday life.	Lerato uses a variety of assessment methods from homework, class activities, to tests with application and analysis questions.
3				
4				

2. Profile of the capacity to support innovation

Level	Physical resources	Teacher factors	Learner factors	School ecology and management
1	In School A, there are basic buildings like classrooms and one office, but not all of them are in good condition. There are prefabricated classrooms and one of them is used as a staff room. There is an old room that is also used as a staff room. Toilets are available for both teachers and learners to use. Some textbooks are available but not enough for all the students. The school has no science laboratories or any other room to accommodate learners when they engage in practical work. Classrooms are electrified except for the prefabricated ones and one of the prefabs is used as a staff room. The school is fenced and there is no security guard but a security guard house. There is a gentleman who helps in keeping the school landscape neat and clean. The learners who are part of the learners' representative council act as security guards during breaks to stop learners from leaving school. There are trees providing shade for learners during break. There is suitable furniture in the classrooms. There is a printing machine that can make photocopied that the school uses. There is running water. There is a bare dusty field that is used as a sports grounds and a Physical Education (PE) field.			
2			Learners in School A, are reasonably proficient in language of instruction. Learners attend school on a regular basis, they are well nourished, they are given adequate time away from home responsibilities to do school work. Learners are given adequate time away from home responsibilities to do school work. They all came from different social and economic backgrounds. Most of the learners cannot afford to buy books. Some of the learners do not come from supportive home environments. Attendance is good. There are cases of learners bringing drugs, guns, knives and other sharp objects to school and hide them in the ceiling.	

3		Lerato has an honours degree and she is qualified for the teaching position and has a sound understanding of subject matter. She clearly linked the content that was taught to what students will do at university level should they choose Science to be their major subject. She always attends her class. She gives up some of her Saturdays to teach extra lessons. She is an active participant in professional development activities whenever they are available.		Tshepo takes strong leadership role, and he is very visible during school hours. He has a teaching load and he is punctual to his lessons. Teachers and learners play an active role in school management especially when it comes to disciplining the learners and encouraging them to stay at school and work hard. There is one teacher who comes at six in the morning to help any of his learners who needs help before school starts. Parents play active role in School Governing Bodies and in supporting the school in general.
4				

3. Profile of support from outside agencies

Types of encouragement and support					
Level	Physical Resources. Categories of resources: buildings, apparatus, curriculum materials (print and electronic), computers, etc.	Design of professional development	Direct support to learners	Dominant change force evoked by agency	Monitoring mechanisms and accountability
1					
2	Provision completely covers what is required to effect the intended change in one category, or partly sufficient in two categories (buildings, curriculum materials, exercise books, textbooks, chalk, duster, printer, cartridge, computer).	Examples of 'new' practices as suggested by the policies are presented to school based personnel, who are given an opportunity to engage in these practices in a simulated situation. Typical mode is a series of short workshops lasting for one year.	Basic academic needs are catered for in the form of extra lessons. Lerato offers Saturday classes.		Inspections are undertaken in collaboration with school-based personnel.
3				Professional. Change is brought about by encouraging role players to embrace codes of conduct and standards of teaching and learning.	
4					

Table 2: Rogan and Grayson (2003) curriculum implementation framework, SCHOOL B (Mandla supported by Sputla)

1. Profile of implementation

Level	Classroom Interaction	Science Practical Work	Science in Society	Assessment
1	Mandla follows the CAPS documents for Physical Science. He uses the prescribed textbook and a few other resources to supplement the textbook. His lesson plans are easily accessible and he follows them as he had planned. In Mandla's classroom, the learners do not freely interact with each other and ask questions.	Mandla stated that there is no laboratory for the learners to conduct investigation, and there is no laboratory equipment to carry out any investigation. He can do demonstrations.	Mandla stated that he does encourage learners to use the classroom content to solve any real life issues or apply science in their everyday or link the content to everyday life.	
2				Mandla uses a variety of assessment methods from homework, class activities, to tests with application and analysis questions
3				
4				

2. Profile of the capacity to support innovation

Level	Physical resources	Teacher factors	Learner factors	School ecology and management
1	In School B, basic buildings like classrooms and a building for the principal's office, deputy- principal's office and a staff room are available although the condition is not satisfactory. Toilets are available. Textbooks are available and they are enough for all the students. The school has no science laboratories or any other room to accommodate learners when they engage in practical work. Classrooms are electrified and the offices and staff room are also electrified. The school is fenced and there is no security guard. There are trees although some of			In School B, the principal was not visible when I went to collect data. He took the responsibility of the principal that day. As the deputy, he has a teaching load. Teachers and learners play an active role in school management especially when it comes to disciplining the learners and encouraging them to stay at school and work hard. Teaching and learning occur most of the time. Parents play active role in School Governing Bodies but not always in supporting the school in general. Some teachers always come late and when the principal enforce the rules, the unions protect those teachers. There are teachers who break the rules and the principal is finding it hard to reprimand them.

	them are not growing well. There is suitable furniture in the classrooms. There is a printing machine that can make photocopied that the school uses. There is running water. There is a bare field that is used as a sports grounds and a Physical Education (PE) field.			School is secure and there is a strong room to keep safe essential materials. Access is denied to unauthorized personnel even though there is no security at the gate.
2			In School B, learners are reasonably proficient in language of instruction. Learners attend school on a regular basis. Learners are well nourished. Learners are given adequate time away from home responsibilities to do school work. They all came from different social and economic backgrounds. Attendance is good.	
3		Mandla has a degree and he is qualified for the teaching position and has a sound understanding of subject matter. With his experience, and as the deputy-principal of the school, he is qualified for the teaching post. He always attends his lessons and carry out some of the duties that the principal of the school would carry out when the principal is absent. He an active participant in professional development activities. He makes an extra effort to improve teaching.		
4				

3. Profile of support from outside agencies

Types of encouragement and support					
Level	Physical Resources. Categories of resources: buildings, apparatus, curriculum materials (print and electronic), computers, etc.	Design of professional development	Direct support to learners	Dominant change force evoked by agency	Monitoring mechanisms and accountability
1		Information on policy and expected changes are presented to school based personnel. Typical mode is short, one shot workshop.	Provision of basic needs, like lunch and place to study.		
2	Provision completely covers what is required to effect the intended change in one category, or partly sufficient in two categories (buildings, curriculum materials, exercise books, textbooks, chalk, duster, printer, cartridge, computer).				Inspections are undertaken in collaboration with school-based personnel.
3				Professional. Change is brought about by encouraging role players to embrace codes of conduct and standards of teaching and learning.	
4					

Table 3: Rogan and Grayson (2003) curriculum implementation framework, SCHOOLC (David supported by Thabang)

1. Profile of implementation

Level	Classroom Interaction	Science Practical Work	Science in Society	Assessment
1	David follows the CAPS documents for Physical Science. He uses the prescribed textbook and a few other resources to supplement the textbook. His lesson plans are easily accessible and he follows them as he had planned. Learners in David's classroom can freely ask questions even though it's not all of them.	David stated that there is no laboratory and no laboratory equipment in their school. He can carry out a demonstration whenever he can. He has an agreement with one of the universities that is not too far from the school to allow learners to come and carry out the investigations in the prescribed curriculum document. The main aim is to collect the data and finish off the analysis back at school.	David stated that he does encourage learners to use the classroom content to solve any real life issues or apply science in their everyday or link the content to everyday life.	
2				
3				David uses a variety of assessment methods from homework, class activities, to tests with application and analysis questions.
4				

2. Profile of the capacity to support innovation

Level	Physical resources	Teacher factors	Learner factors	School ecology and management
1				
2	In School C, there are adequate basic buildings and one office in good condition. Suitable furniture is available and it is adequate and in good condition. There is a prefab classroom that is used as a staff room by other teachers. Toilets are available. Textbooks are available and they are enough for all the students. The school has no science laboratories or any other room to accommodate learners when they engage in practical work. Classrooms are		In school C, learners have some proficiency in the language of instruction. Learners attend school on a regular basis. Learners are well nourished. Learners are given adequate time away from home responsibilities to do school work. They all came from different social backgrounds. Attendance is good.	

	electrified. The school is fenced and there is security guard. There are trees. There is suitable furniture in the classrooms. There is a printing machine that can make photocopied that the school uses. There is running water. There is a bare dusty field that is used as a sports grounds.			
3		David has a degree and he is qualified for the teaching position and has a sound understanding of subject matter. He might have qualified with a BSc (Bachelor of Science) degree, he has a solid content knowledge of the subject. He has a Certificate of education. He always attends his lessons. He is an active participant in professional development activities. He makes an extra effort to improve teaching. He organises for the students to carry out their investigation at the nearby university.		In School C, the principal takes strong leadership role, and she is very visible during school hours. Teachers and learners play an active role in school management especially when it comes to disciplining the learners and encouraging them to stay at school and work hard. Parents play active role in School Governing Bodies and in supporting the school in general.
4				

3. Profile of support from outside agencies

Types of encouragement and support					
Level	Physical Resources. Categories of resources: buildings, apparatus, curriculum materials (print and electronic), computers, etc.	Design of professional development	Direct support to learners	Dominant change force evoked by agency	Monitoring mechanisms and accountability
1		Information on policy and expected changes are presented to school based personnel. Typical mode is short, one shot workshop.			
2	Provision completely covers what is required to effect the intended change in one category, or partly sufficient in two categories (building, curriculum materials, exercise books, textbooks, chalk, duster, printer, cartridge, computer).				Inspections are undertaken in collaboration with school-based personnel.
3			Enriched academic needs are catered for in the form of field trips and other enrichment type activities. As he organises for learners to carry out their investigations at a nearby university.	Professional. Change is brought about by encouraging role players to embrace codes of conduct and standards of teaching and learning.	
4					

Table 4: Rogan and Grayson (2003) curriculum implementation framework, SCHOOLC (Sizwe supported by Thabang)

1. Profile of implementation

Level	Classroom Interaction	Science Practical Work	Science in Society	Assessment
1	Sizwe follows the CAPS documents for Physical Science. He uses the prescribed textbook even though the textbooks are not enough for everyone to get a copy.	Sizwe stated that there is no laboratory and no laboratory equipment in their school. As he is in the same school as David, they will use the same method of taking the learners to the university to carry out the investigations.	Sizwe stated that he does not encourage learners to use the classroom content to solve any real life issues or apply science in their everyday or link the content to everyday life.	Sizwe stated that he uses tests only as a way of assessing his students.
2				
3				
4				

2. Profile of the capacity to support innovation

Level	Physical resources	Teacher factors	Learner factors	School ecology and management
1				
2	In School C, there are adequate basic classrooms for the learners and one office. There is a prefab classroom that is used as a staff room by other teachers. Toilets are available. Textbooks are available and they are enough for all the students. The school has no science laboratories or any other room to accommodate learners when they engage in practical work. Classrooms are electrified. The school is fenced and there is security guard. There are trees. There is suitable furniture in the classrooms. There is a printing machine that can make photocopied that the school uses. There is running water. There is a bare dusty field that is used as a sports grounds.		In school C, learners have some proficiency in the language of instruction. Learners attend school on a regular basis. Learners are well nourished. Learners are given adequate time away from home responsibilities to do school work. They all came from different social backgrounds. Attendance is good	
3		Sizwe has a degree and he is qualified for the teaching position and has a sound understanding of subject matter. He always attends his lessons. He is an active participant in professional development activities. He makes an		In School C, the principal takes strong leadership role, and she is very visible during school hours. Teachers and learners play an active role in school management especially when it comes to disciplining the learners and encouraging them

		extra effort to improve teaching.		to stay at school and work hard. Parents play active role in School Governing Bodies and in supporting the school in general.
4				

3. Profile of support from outside agencies

Types of encouragement and support					
Level	Physical Resources. Categories of resources: buildings, apparatus, curriculum materials (print and electronic), computers, etc.	Design of professional development	Direct support to learners	Dominant change force evoked by agency	Monitoring mechanisms and accountability
1		Information on policy and expected changes are presented to school based personnel. Typical mode is short, one shot workshop.			
2	Provision completely covers what is required to effect the intended change in one category, or partly sufficient in two categories (building, curriculum material, exercise books, textbooks, chalk, duster, printer, cartridge, computer).				Inspections are undertaken in collaboration with school-based personnel.
3			Enriched academic needs are catered for in the form of field trips and other enrichment type activities. As he organises for learners to carry out their investigations at a nearby university.	Professional. Change is brought about by encouraging role players to embrace codes of conduct and standards of teaching and learning.	
4					