

# **Revisiting the teaching and learning of Life Sciences in schools: the effect of curriculum change on teacher attitudes.**

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**JANUARY 2016**

**REVISITING THE TEACHING AND LEARNING OF LIFE SCIENCES IN  
SCHOOLS: THE EFFECT OF CURRICULUM CHANGE ON TEACHER  
ATTITUDES**

**BY**

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**A DISSERTATION SUBMITTED IN FULFILMENT OF THE  
REQUIREMENTS IN RESPECT OF THE MASTER'S DEGREE  
QUALIFICATION M.ED CURRICULUM STUDIES IN THE DEPARTMENT  
OF MATHEMATICS NATURAL SCIENCES AND TECHNOLOGY  
EDUCATION IN THE FACULTY OF EDUCATION AT THE UNIVERSITY OF  
THE FREE STATE, BLOEMFONTEIN.**

**DATE: JANUARY 2016**

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## DECLARATIONS

“I, Okwara, Valentine Ukachukwu, declare that the Master’s Degree research dissertation that I herewith submit for the Master’s Degree qualification M.ED Curriculum Studies at the University of the Free State is my independent work, and that I have not previously submitted it for a qualification at another institution of higher learning”.

“I, Okwara, Valentine Ukachukwu, hereby declare that I am aware that the copyright is vested in the University of the Free State”.

“I, Okwara, Valentine Ukachukwu, hereby declare that all royalties as regards intellectual property that was developed during the course of and/or in connection with the study at the University of the Free State will accrue to the University”.

**Student:** Okwara, Valentine Ukachukwu .....

**Supervisor:** Dr JPH Pretorius.....

**Co-supervisor:** Professor L Jita.....

## **DEDICATION**

This M.ED dissertation is dedicated to the two women who played important roles in my life:

My late mom, Nneoma Virginia Michael Okwara (Nneoma nwereugwu of Orlu), who taught me humility, tolerance and absolute trust in God.

My wife, Mrs Gloria Setshego Okwara, a wonderful mother, sister and friend, a pillar of strength and support, thanks for always being there for me.

## **ACKNOWLEDGEMENTS**

I wish to use this opportunity to extend my heartfelt gratitude and immense thanks to my supervisor Dr JPH Pretorius for making this research dissertation a dream come true, also my co-supervisor Professor L Jita for his wonderful input and advise that helped me in fulfilling this dream. I also wish to acknowledge the Free State Department of Education research unit for granting me the much needed permission to embark on this research project. I also wish to thank the principals of the schools where this research project was carried out and also the Life Sciences teachers who sacrificed their valuable time to participate in this research project and contribute to the body of knowledge that will help Life Sciences education. I also wish to thank my family, the entire Michael Okwara family in Nigeria and most especially, my wife, Gloria, for all her encouragement and support. I would also like to thank Dr BB Moreeng for his support. Most importantly, I am thanking God almighty and Virgin Mary mother of Jesus for making this dream a reality.

## **ABSTRACT**

Curriculum change has always been associated with new conceptualisations and practices which the Life Sciences teachers may not be too familiar with. These affects their attitudes towards curriculum change and influence their classroom practices. In this study conducted with Life Sciences teachers, it was found that factors such as the negative beliefs and perceptions of the teachers towards curriculum change, inadequate content knowledge, ambiguous curriculum language, non-adherence to curriculum policy on assessment and planning will negatively influence the teachers' attitudes towards curriculum change and their classroom practices while factors such as adequate content knowledge, curriculum materials that are easy to understand and interpret as well as curriculum content that relates to the learners' everyday lives will positively influence the teachers' attitudes and practices. Positive attitudes towards curriculum change will positively influence the teachers' effective classroom practices.

**Keywords:** Curriculum change, implementation, positive attitudes, beliefs, perceptions, classroom practices, professional development, CAPS curriculum, Life Sciences, adequate content knowledge.

# CHAPTER ONE

## CONCEPTUALISATION OF THE STUDY

---

### 1.1 INTRODUCTION

Change has become a permanent feature of modern day life, and education is not immune to these tendencies (Wallace and Priestly, 2011:357). In South Africa, social transformation and the quest to address the past imbalances in education has led to curriculum changes since the inception of democracy in 1994 (Bantwini and McKenzie, 2011:5). The latest curriculum change involved the introduction of the Curriculum and Assessment Policy Statements grade R-12 (CAPS) which aims to improve on the previous National Curriculum Statements (NCS) curriculum (Altinyelken, 2010:151).

The implementation of a new curriculum may be challenging, because it requires the teachers' developing new ways of thinking and a stronger ownership of their classroom practices. This may influence their attitudes towards their classroom practices (Bantwini and McKenzie, 2011:6; Chisholm, 2005:194). Mata (2012:514) indicated that curriculum change involves a detailed alteration of the aspects of the curriculum such as the underlying philosophy, values, objectives, organisational structures and materials as well as teaching strategies, learner experiences, assessment and learning outcomes, with the sole aim of improving the learning experiences of the learners. It therefore requires the teachers to alter their instructional behaviour in their classroom practices.

The teachers' attitudes towards their classroom practices may also be influenced by inadequate requisite content knowledge to interpret the curriculum change. The inability of the teachers to understand the language of the curriculum design, as well as their beliefs and perceptions regarding the curriculum change (Charalambous and Philippou 2010:1; Kruger, Won and Treagust, 2013:43) also influence their classroom practices. The attitudes of the teachers towards curriculum changes often contribute to some of the challenges encountered in the implementation of the

curriculum change in the classroom. When the teachers' knowledge, experience and pedagogical beliefs are in conflict with the intended curriculum change, it becomes difficult for it to be successfully implemented (Kruger, Won and Treagust, 2013:43). It has therefore become more difficult to find evidence that classroom practices have improved or even fundamentally changed as a result of the many curriculum change initiatives (Wallace and Priestley, 2011:358). In this study, the researcher will employ an interpretivist's frame to explore curriculum change and its effects on Life Science teachers' attitudes and also the influence of their attitudes on their classroom practices. In the next paragraph, the background that informed this study will be discussed.

## **1.2 BACKGROUND TO THE STUDY**

The implementation of curriculum changes in most Sub-Saharan African countries has resulted in the waste of resources, time and effort because it has failed to achieve the intentions behind the changes, and the purpose for the change have not been translated into classroom reality (Rogan, 2004:166). Sub Saharan African countries in the past few decades have been involved in educational reforms particularly in the development of new curriculum influenced by both external and internal forces (Chisholm and Leyendecker, 2008:195). Curriculum change more often may be attributed to factors in a country's political, social, economic, cultural and technological demands which the changes are expected to address (Mata, 2012:512). Globalisation has speeded up the exchange of cultural, educational and curricular knowledge and practices across different cultures around the world, which took the construction of the curriculum beyond local practices. Globalisation has therefore been a key force driving curriculum change in education.

Studies conducted by different scholars on the reasons for the failures in curriculum change implementation identified such factors as the teachers' inadequate content knowledge as being significant (Seikkula-Leino 2011:74, Hudson, 2013:365, and Gerrard and Farrell, 2014:638). A common policy response to this is to provide the teachers with access to teacher training activities that aim to develop their knowledge of the curriculum change and how to implement it (Ryder and Banner, 2013:491), but it does not address the fundamental issues relating to beliefs, perceptions, attitudes, experiences and classroom practices of the teachers

(Spillane, 2010:146). The teachers' beliefs about teaching, their perceived theory of action as well as their notions of self-efficacy play a role in curriculum change implementation. The failures associated with curriculum change implementation are often accelerated by the feelings of disempowerment owing to the pressure of expectations from policy on the teachers as agents of curriculum change implementation (Priestley, 2011:2).

In a study conducted in the United States of America State of Michigan, on the impact of curriculum change on the Mathematics curriculum, researchers identified collegial, interactive working practices among science teachers as a major factor that enabled the teachers to respond positively to the reform (Ryder and Banner, 2013:492). This suggests that Life Sciences teachers need to work as a team interact with one another and share ideas in order to effectively respond positively to the challenges of curriculum change implementation and improvement in their classroom practices. In South Africa, the new Life Sciences CAPS curriculum introduced a lot of changes with regards to the subject content and assessment; it lays more emphasis on inquiry as the basis of scientific investigation and knowledge through increased practical work (DBE, 2011:8). This may be challenging to the teachers in terms of their competence in their classroom practices.

To have a considerable education, we need to have a systematic, appropriate and up-to-date curriculum which covers the current knowledge as well as teachers who are capable of translating the intentions of the curriculum into classroom reality. These teachers must have a broad understanding of the curriculum intentions and the expertise to accomplish these intentions (Pateşan and Bumbuc, 2010:1). The expertise to successfully implement curriculum changes will be affected by the teachers' lack of understanding of the curriculum change, lack of classroom support and lack of in-service professional development (Bantwini, 2010:87-88). Altinyelken (2010:151) argues that policy makers need to consider and plan for the implementation stage if the educational reforms are to be successful because implementation is a very critical stage of the curriculum process. Makhwathana (2007:27) further reaffirms Altinyelken's argument, by stressing the importance of the quality of educators, principals and inspectors as well as their content knowledge and competence as a key factor in the successful implementation of curriculum



change. In South Africa, the Life Sciences teachers' content knowledge, competence, and attitudes are crucial to the successful implementation of the new CAPS curriculum in the classroom. Many studies have been conducted on the gap between policy and practice in curriculum changes and implementation, but few studies have been conducted on how the teachers' attitudes to curriculum changes influence its implementation in the classroom (Park and Sung, 2013:16). Given this background information, it becomes important for the researcher to conduct this study to explore the effects of curriculum change on Life Sciences teachers' attitudes and how it influences their classroom practices. In the next paragraphs, the research problem and research questions will be fully discussed.

### **1.3 RESEARCH PROBLEM AND RESEARCH QUESTIONS**

The attitudes of the teachers towards curriculum change act as a guide in the journey towards its effective implementation in the classroom, and determine the successes and/or failures of its implementation (Bantwini, 2010:83). The teachers' capacity and will to implement the change, according to Priestley (2011:2) is crucial to the successes or failures of curriculum change implementation. These scholars suggest that the attitudes of teachers towards curriculum change amongst other factors are important to the effective implementation of the change in the classroom. The above views together with the most recent introduction of the curriculum and assessment policy statements (CAPS) prompted the researcher to ask the following questions;

1. How have the changes to the Life Sciences curriculum affected the teachers' attitudes?
2. How have the attitudes of the teachers to the changes in the Life Sciences curriculum affected their classroom practices, if at all?
3. How can the effect of curriculum changes on teachers' attitude, if any be understood?
4. What suggestions and / or recommendations can be made to address the effects of curriculum change on teachers' attitudes, if any?

The following assumptions serve as the basis for conducting this research;

- Although curriculum changes are aimed at improving the quality of teaching and learning (classroom practices), it may have an effect on

the teachers' attitudes which may affect the overall teaching and learning objectives of the curriculum.

- Since knowledge is socially constructed and hence can be subjective or have multiple interpretations, therefore, in order to understand and interpret the effects of curriculum changes on teacher attitudes and practices, one has to explore how the teachers' attitudes and classroom practices are affected by the changes.

#### **1.4 THE AIM OF THE RESEARCH STUDY**

In view of the above mentioned research questions, the aims of this study therefore are to understand how the new Life Sciences curriculum (CAPS) affects the teachers' attitudes, and their classroom practices. In achieving this goal, the following main **OBJECTIVES** are set:

1. To understand and interpret the influence of curriculum changes on the Life Sciences teachers' attitudes.
2. To understand and interpret the influence of the curriculum change on the teachers' classroom practices.
3. To develop an account of how curriculum changes shape teachers' attitudes and practices.
4. To formulate recommendations and/or guidelines that will equip teachers with the necessary knowledge to deal with curriculum changes and enhance their classroom practices.

In the next paragraph, the theoretical framework for the study will be discussed.

#### **1.5 THEORETICAL FRAMEWORK**

This study was informed by the literature on curriculum change implementation and its influence on teachers' attitudes and framed by the interpretivist perspective on change implementation and the influence of the change on the teachers' classroom practices. The role of the teacher in the implementation of the curriculum change in the classroom is crucial to the achievement of the necessary curriculum change objectives (Singh, 2012:595). The Implementation of curriculum change involves the interpretation of the curriculum policy of which the teachers must figure out whether

to ignore, adapt or adopt the change policy (Spillane, 2010:145). How the planning, teaching and assessment are carried out depends on the overall ability of the teachers in terms of their professional development and subject content knowledge, as well as their attitudes toward the curriculum change implementation (Charalambos and Philippou, 2010:2). This suggests that the attitude of the teachers towards the curriculum change amongst other factors plays an important role in the successful implementation of curriculum change in the classroom.

Within the general interpretivist viewpoint, a key dimension to the implementation of curriculum change is how the teachers understand and interpret the curriculum change policy and how they adapt their mind in response to the change implementation in the classroom (Spillane, 2010:145). Interpretivism suggests the existence of multiple realities or knowledge which it seeks to understand and explain rather than passive absorption of knowledge (Mlitwa and Van Belle, 2010:2).

How the teachers interpret the curriculum change therefore depends on how they make sense of it. According to Bunniss and Kelly (2010:360), interpretivism “[...] is associated with an interpretive effort to gather a range of in-depth accounts with the aim of building a detailed picture of how a particular phenomenon is understood by those who have personal experience of it”. The ontology of interpretivism is based on the assumptions that: the actions of people are guided by their beliefs and meanings, and that realities are interpreted differently by people based on the circumstances in which they occur (Hay, 2011:169). The epistemology of interpretivism assumes that knowledge is socially constructed and hence can be subjective; this means that there are multiple diverse interpretations of reality and meaning as constructed in the researcher–participant interactions in the natural environment (Bunniss and Kelly, 2010:361). The understanding of the effects of curriculum changes on teachers’ attitudes is important to explaining how it influences their classroom practices (Hay, 2011:169). Within the context of this theoretical framework, my goal in this study therefore is to understand and interpret the effects of curriculum changes on Life Sciences teachers’ attitudes and how it influences their classroom practices rather than to generalize and predict cause and effect (Carson *et al*, 2001: 6).

In the next paragraphs the research design and methodology employed in this study will be discussed.

## **1.6 THE RESEARCH DESIGN AND METHODOLOGY**

### **1.6.1 RESEARCH DESIGN**

Research design and methodology, describes the research process and the kind of tools and procedure that will be employed in the research. It also emphasise the individual steps in the research process and the most objective procedure to be employed (Major and Savin-Baden, 2010:128). The researcher will employ a qualitative research design for this study. According to Grosseohme, (2014:109) qualitative research is the systematic collection, organization, and interpretation of textual material derived from talk or conversation. Qualitative research may be in the form of a case study, where data is collected from a single person or group of people (Risk, 2013:82). According to Baxter and Jack, (2008: 545), case study design should be considered when the focus is to answer 'how' and / or 'why' questions in a research study. This design will enable the researcher to gather comprehensive information from Life Sciences teachers on the effect of curriculum changes on teachers' attitudes and its influence on their classroom practices, thereby making for a better understanding of the phenomena being studied.

### **1.6.2 THE RESEARCH METHODOLOGY**

The case study research methodology is employed in this study. The methodology employed in the gathering of data for this study is semi-structured interview with open-ended questions. The semi-structured interviews were conducted with Life Sciences teachers from three different schools in the Motheo district of the Free State. The researcher wanted to explore how each participant is affected by the changes in the Life Sciences curriculum and how it influences their classroom practices According to Kvale (2005:89) qualitative research interviewing is a sensitive and powerful method of data collection. It adopts an interpretive stance to social reality, and involves a mutual meaning construction between the researcher and the participant (Tracy and Robles, 2010:180).

For a researcher to achieve a successful interview, he must understand and relate to the participants in ways that facilitate mutual understanding (Roulston, 2014:278). If the researcher has specific areas to cover and/or narrow down in the questions posed to the participants during the interviews, the semi-structured interview is the ideal data collection tool (Rabionet, 2011:564). The researcher will conduct semi-structured interviews with grade 10 – 12 Life Sciences teachers from the selected schools in order to explore their views on the effect of curriculum change on teachers' attitudes and how their attitudes have influenced their classroom practices.

#### **1.6.2.1 THE PARTICIPANTS IN THE STUDY**

The target population in this study is three grade 10; 11 and 12 Life Sciences teachers from three different schools in the Motheo district of the Free State. They were purposefully selected because they had the experience of teaching within the previous NCS and the present CAPS curriculum. Their schools' performances in Life Sciences in the National School Certificate Examinations have been consistent at 100%, above 70% and below 50% for the last five years according to the data from the Free State department of Education. The participants were identified via their school consistent performances and purposefully selected. There will be three respondents, each from a participating school, making a total of three teachers.

#### **1.7 DATA COLLECTION**

The data collection procedure includes visits to the participating schools. Prior to that, the participants will be contacted telephonically to arrange for suitable dates and time for the visits. The reason is to collect data when the teachers are not actively engaged with their learners and also to avoid any loss of tuition time during data collection. Semi-structured interviews will be employed during data collection. It will consist of series of open-ended questions. The open-ended questions will be verbally presented to the participants during the interviews, and their responses to the questions will be recorded with their permission. The researcher will determine the precise form and direction of the questions which will provide him with a quick and easy way of obtaining data thereby saving time (Rabionet, 2011:565).

## **1.8 DATA ANALYSIS**

The researcher will adopt Tesch's method which is cited in Creswell (2007:192) in the analysis and interpretation of the data. All the data obtained through the semi-structured interviews will be categorised into meaningful themes ranging from phrases to sentences, this is called open coding. Open coding is the initial classification and labelling of concepts in the data, while axial coding is the re analysis of the results of open coding aimed at identifying the important general concepts in the text (Babbie, 2010:401-402).

Coding will be both descriptive and interpretive. Descriptive codes will enable the researcher to identify general areas of interest in relation to the research question – such as teacher attitudes towards curriculum changes, how it influences their classroom practices, and factors that inform their attitudes towards curriculum change. The second layer of coding will enable the researcher to apply interpretive codes based on the meaning of the responses from the participants (Wallace and Priestley 2011: 365). This is called axial coding; it will enable the researcher to code the words or quotations that form the basis of each category's core or axis (Grossoehme, 2014:116).

## **1.9 ASSESSING TRUSTWORTHINESS**

Trustworthiness in qualitative research includes such issues as credibility, dependability, transferability and conformability (Sinkovics, Penz, and Ghauri, 2008:689). Trustworthiness involves the ability of the researcher to demonstrate that he has established a rationale for the study, a clear description of the data collection procedure, data analysis method and a clear description and interpretation of data. The researcher's aim is to develop an understanding of the phenomenon being studied by looking at how the participants' experiences contribute to answering the research questions and make sense of their work as Life Sciences teachers (Kornbluh, 2015:397). The researcher will use data from different sources as well as employing consistency checks. Consistency checks involve giving someone the raw data to code and also allowing the participants to check or comment on the interpretation of their transcribed interviews (Kornbluh, 2015:398).

## **1.10 ETHICAL CONSIDERATIONS**

According to Thompson and Russo (2010:33), ethics are moral principles and values which guide action .It involves sets of principles aimed at safeguarding or assuring the rights of the participants in a qualitative study (Locke, Alcorn and O'Neill, 2013:108). It sometimes contributes to the strengthening of the research (Tangen, 2014:678), and involves the protection of the participants. These scholars further describe the concept of research ethics as focusing on the moral principles specifically needed to guide scientific research.

In social research, it is commonly agreed that participants should make their own decision about being involved in an unconstrained manner, based on accurate and comprehensive information about the study. They also have the right to remain anonymous and to withdraw from the study at any time (Wang, 2013:770). In line with this scholar's suggestion, the researcher will be aware of the participants' concerns, and clarify with them the limits of the study to ensure that it will provide no risk of significant harm to the individual participants involved in terms of loss of privacy; loss of competitive opportunity; or harmful social and psychological consequences. The researcher will respect the dignity and worth of the participants, their welfare shall take precedence over the researcher's self-interest in order to ensure that trustworthiness is upheld.

## **1.11 VALUE OF THE RESEARCH**

Research leads to progress in science education, its main objective being to achieve progress in economic growth, social development and environmental protection. In the researcher's discipline, it will lead to the understanding of the effects of curriculum change on teachers' attitudes and the influence of their attitudes on their classroom practices. This will enable Life Sciences teachers to better handle the uncertainties that are associated with change management and successfully implement curriculum change that fulfils its objectives for the teaching of Life Sciences as well as assessment and evaluation techniques.

## 1.12 LAYOUT OF THE RESEARCH STUDY

The layout for this study will comprise of the following chapters;

**Chapter 1**, This chapter is introductory, it comprises the conceptualisation of the study, whereas in **Chapter 2** a review of relevant literature on curriculum change, implementation and teacher attitudes - both globally and South African perspectives will be made to gain insight into how curriculum change might affect the attitudes of Life Sciences teachers and its subsequent influence on their classroom practices.

**Chapter 3**, the main focus in this chapter will be the research design and methodology employed in investigating the effects of curriculum changes on teachers' attitudes, specifically focusing on the new Life Sciences CAPS curriculum and how it influences their classroom practices. The data towards this is obtained through semi-structured interviews. The data is analysed and interpreted in chapter 4. In **Chapter 4** the data collected through semi-structured interview will be analysed, interpreted and compared with the literature studied to expose its similarities and differences. In **Chapter 5** the findings of this research will be summarised, a conclusion drawn and guidelines will be formulated which will equip Life Sciences teachers with the necessary knowledge to enhance their classroom practices in lieu of curriculum change. The limitations of this study and recommendations for further study will also be discussed.

## 1.13 SUMMARY

Chapter 1 provided background information that informed this research study. The research questions, aims and objectives were discussed as well as the methodology employed in the achievement of the research objectives together with the layout of the research chapters.

The next chapter will focus on literature study on curriculum changes and implementation, as well as teachers' attitudes. The implications of curriculum changes on teacher attitudes especially for the Life Sciences teachers and its effects on their classroom practices as well as the importance of proper curriculum implementation in the classroom will also be discussed.



# CHAPTER 2

## LITERATURE STUDY ON CURRICULUM CHANGE, IMPLEMENTATION AND TEACHER ATTITUDES

---

### 2.1 INTRODUCTION

The curriculum is the most important document through which a country expresses its educational requirements (Seikkula-Leino, 2011:70), and therefore it is subject to changes in order to ensure its relevance. In this chapter, the researcher will review relevant literature on curriculum change, implementation and teachers' attitudes towards curriculum change. As highlighted in chapter 1, the school curriculum in South Africa has been characterised by changes since 1994 (Bantwini and McKenzie, 2011:5). Curriculum changes are often associated with the improvement of the existing curriculum (Altinyelken, 2010:151), or as a consequence of the country's political, socio- economic or technological demands (Mata, 2012:512).

Teachers are often the individuals most involved in educational reforms, and their attitudes towards the reform process are crucial to its successful implementation (Van Veen and Slegers, 2006:234). Other factors apart from the teachers' attitudes which may influence curriculum change implementation include their professional development and their understanding of the reform documents (Park and Sung, 2013:17).

In Life Sciences, the teachers have experienced a series of curriculum changes since 1994. These changes can be attributed to, firstly, the lack of enough botany content in the initial NCS curriculum, secondly, the numerous portfolio pieces required for assessment, and thirdly, the ambiguous NCS curriculum language (Van Wyk 2013:7). The Life Sciences teachers in experiencing these changes have formulated their own meanings and attitudes on how to engage in their pedagogical practices which subsequently have influenced their classroom practices (Park and Sung, 2013:15). It has therefore become very important that the teachers' attitudes

towards curriculum changes are crucial to its successful implementation (Park and Sung, 2013:16).

In the next section, the curriculum change and implementation will be discussed.

## **2. 2 CURRICULUM CHANGE AND IMPLEMENTATION**

Over the past decades, many countries including South Africa, have implemented curriculum changes. Curriculum change involves the development and introduction of a new curriculum with the aim of enhancing the learners' knowledge, skills and dispositions in order for them to stay competitive in an ever changing society (Ibrahim, Al Kaabi, and El-Zaatari, 2013:27). This suggests that curriculum change is a means of updating the learners' knowledge by equipping them with all the necessary skills and knowledge that will enable them to face the challenges of education in a dynamic society.

Social transformation plays an important role in curriculum changes especially when the change is aimed at not only changing the curriculum but also developing the human resources necessary to meet the requirements for global competition through the production of new curriculum (Luo, 2011:43). Most often, technical development or the need to transform societies based on values or ideological and political objectives can also necessitate curriculum changes (Seikkula-Leino, 2011:73). Curriculum changes in education are increasingly shaped by global policy ideas and practices (Savage and O'Connor, 2015:626) and this new policy trend is defining a new global policy norms. Curriculum change in South Africa and other African countries has become necessary because of the need to transform the education sector to reflect the current global trends and also the need to provide education that conforms to international standards (Lipinge and Kasanda, 2013:439).

The main focus of curriculum change is to ensure that the needs for rapid transformation in the age of globalisation are met (Ng, 2009:188) through the provision of a sound curriculum. The updating or changing of an existing curriculum involves a detailed alteration of some aspects of the curriculum such as the underlying philosophy, values, objectives, organisational structure, materials as well as the teaching strategies, learner experiences, assessment, and learning outcomes

(Mata, 2012:514). Most of the curriculum changes were well designed with valuable aims, but the good intentions of the curriculum changes have not been realised in their implementation (Park and Sung, 2013:15) because the curriculum change have failed to achieve its objectives. Curriculum changes have a great impact on the work of teachers and the classroom experiences of the learners (Ryder 2015:87). Curriculum change imposes a lot of demands on teachers. Curriculum change is a process and an embodiment of diverse skills and knowledge needed in managing emergent conflicts and contradictions in ideas, understandings, and relationships (Teo 2013:90). There are three categories of players involved in the process of curriculum change, these are, the policy makers; the people who formulate the policies, the middle-level administrators; who interpret the policies, and the teachers who ensure the Implementation of the curriculum change in their classrooms (Wang, 2010:126).

Teachers are often the targets and agents of curriculum change implementation (Gerrard and Farrell, 2014:639). Their knowledge, beliefs and attitudes play significant roles in the effective implementation of the change (Briant and Doherty, 2012:54). A study conducted in Hong Kong by Tong (2010:232), found that in addition to the knowledge, beliefs and attitudes of the teachers, the tension experienced by the teachers between their personal beliefs and the orientation of the curriculum change, as well as their ability to understand the curriculum documents are also some of the barriers to significant curriculum change implementation.

The teachers' inadequate content knowledge and classroom practices are most often blamed for the failures in curriculum change implementation (Gerrard and Farrell, 2014:638), but the failures encountered in curriculum change implementation cannot be attributed to the lack of content knowledge needed to implement the curriculum change alone, rather it can also be attributed to factors relating to the teachers formulating their own meanings and attitudes when the reform documents are introduced to them, which may lead to their ignoring or resisting the change (Park and Sung 2013:15). Some teachers view curriculum change as merely intensifying their workload without providing any change benefit (Park and Sung 2013:21). It is therefore important that understanding what the teachers perceive as

the purpose of the curriculum change is crucial to successful curriculum change implementation.

In addition to the above scholars' views on why curriculum change implementation fails, Ryder and Banner (2013:491) emphasised that many studies have shown that appropriate teacher knowledge and pedagogical expertise does not guarantee successful implementation of the curriculum change, but external factors relating to the curriculum reform, personal factors relating to teacher identity; who they see themselves as and their teaching goals, as well as internal factors relating to work environment, all play significant roles in the successful curriculum change implementation.

Another factor which may contribute to curriculum change implementation successes or failures are the teachers' attitudes towards the change and how they implement the change in their classroom practices (Ha, Wong, Sum and Chan, 2008:79). Although implementing curriculum change is highly related to the teachers' changing their attitudes towards the curriculum change, few studies have suggested that how the teachers receive the change and their capacity to implement the change is crucial (Ha *et al*, 2008:81). As curriculum change implementers, teachers are expected to develop a new set of capacities and skills (Qian and Walker, 2013:306) necessary for curriculum change implementation. Teacher professional development therefore becomes necessary for curriculum change implementation. Many scholars argue that although professional development in itself is not the sole reason for the failures of curriculum change implementation, it does play an important role (Gerrard and Farrell, 2014:638; Park and Sung, 2013:18:26; Chan, 2012:374) because it ensures an up-to-date knowledge (Li, Ni, and Tsoi, 2012:23) of the curriculum materials and also provides new skills (Spillane, Healey and Parise, 2009:407) needed to ensure appropriate implementation.

Enhancing the teachers' professional development play a role in successful curriculum change implementation. Professional development programmes designed to initiate changes in the teachers' attitudes, beliefs, and perceptions will lead to specific changes in their classroom practices, if the contents of such programmes are adjusted to the teachers' level of knowledge and experience as well as the

provision of adequate monitoring and support (Park and Sung, 2013:18). In a study conducted in Hong Kong, professional development programmes for teachers included on-site school-based support, creation of time and space for teachers, dissemination strategies and networks which enabled them to successfully implement the curriculum change (Chan 2012:374). Inadequate professional development denies the teachers the necessary tools to effectively implement the curriculum change (Park and Sung, 2013:26).

Professional development as a strategy should be used by reformers to improve the classroom practices of teachers because through learning, teachers acquire new knowledge and skills (Spillane, Healey and Parise, 2009:407) necessary for the implementation of the curriculum change. Professional development makes it easier for the teachers to understand the curriculum objectives, because it provides an opportunity for them to learn and relearn the new curriculum content because change is a process of coming to grips with the new (Fullan and Miles, 1992:746). If teachers work in policy environments where they have few opportunities and few incentives to learn about revising their practice, then they are less likely to enact the curriculum changes (Spillane, 2000:142). Effective curriculum change implementation does not rely solely on the teachers' ability to make personal and professional changes; it also involves the knowledge of change process. Ha *et al*, (2008:89), indicated that change occurs in a variety of ways and when it involves curriculum change, educational leaders, school administrators, teachers and all stakeholders are all needed to effectively implement the change, however, teachers are always expected to execute the change alone without the support of other stakeholders.

Ha Wong, Sum and Chan (2008:90) also argue that teacher development curriculum should contain explicit education in the management of change in order to help teachers grasp the knowledge and skills to cope with curriculum changes. In order to ensure successful curriculum change implementation, the teachers should be involved in the design and planning of the programme (Ha *et al*, (2008:92). The knowledge of the curriculum materials especially the curriculum contents also play a crucial role because they provide the basic tool for the successful implementation of curriculum changes (Li, Ni, and Tsoi, 2012:23).

In the next paragraphs the connection between curriculum change and classroom practices will be discussed.

### **2.3 CONNECTION BETWEEN CURRICULUM CHANGE AND CLASSROOM PRACTICES**

Curriculum change does not only imply change, but at the same time an improvement in the classroom practices of the teacher (März and Kelchtermans 2013:13) because innovative ideas have to be translated into new educational practice. How the teachers receive the change has an influence on their classroom practices. Research conducted in the United Kingdom showed that science teachers were reluctant to commit to change in their classroom practices given their experience of the inconsistencies in education as they believe that in a few years the curriculum will revert back to what it used to be (Ryder and Banner 2013:511). Curriculum policy reformers therefore need to provide significant periods of curriculum and assessment stability to ensure significant change in the teachers' classroom practices.

Research conducted in mainland China (Li and Ni, 2012:19) showed that science teachers faced some problems in the implementation of the curriculum change in their classrooms. These problems are fundamental practical and theoretical problems that will persist in a long term in international curriculum change and therefore requires further clarification. Other research conducted in the United States of America (Moyer, Cai, Wang and Nie, 2011:96-97) showed positive changes in the teachers' classroom practices as a result of the curriculum reform. These changes in classroom practices relate to the consistency between curriculum and instruction which helped to actualize student learning.

The science teachers' understanding and usage of curriculum materials have also been found to influence their classroom practices (Roehrig, Kruse and Kern, 2007:885). These scholars indicated that the usage of curriculum materials depends on the teachers' content knowledge and their beliefs about the curriculum change, teaching and learning. These beliefs tend to guide their instructional decisions, and influence their classroom practices. Another factor that may influence the teachers' classroom practice is their level of professional development. Professional

development increases the knowledge base of the teacher and better their classroom practices (Desimone 2009:185).

Apart from the issues relating to the lack of knowledge on curriculum change, and how to implement the curriculum changes, there are other factors associated with curriculum changes which might affect the teachers' classroom practices. These are contextual factors related to access to cultural and material resources, and the existence of social structures which might restrict the teachers' active engagements in implementing the reform (Priestly, 2011:2). These factors the scholar suggests may include the quantitative use of attainment data and the use of outcomes backed by rigorous inspection regimes, which tend to erode teachers' autonomy, thereby affecting their classroom practices. Curriculum changes are often associated with changes in the subject curriculum which might be challenging to the teachers' pedagogical knowledge. If teacher training does not promote changes in the teachers' attitudes and perspectives and also promote the teachers knowledge of the new curriculum, the intended reform cannot be realized (Park and Sung, 2013:30). This might affect the teachers' ability to effectively implement the curriculum change in their classroom practices.

In the next paragraphs, the overview of the various South African curriculums since 1994 will be presented discussing the nature of the curriculum, the role of the teacher as well as their failed implementation.

## **2.4 THE SOUTH AFRICAN CURRICULUM SINCE 1994**

The school curriculum in South Africa have been characterised by changes since 1994 (Bantwini and McKenzie, (2011:5). In the paragraphs below, the researcher will review and discuss the different South African curriculum since 1994.

### **2.4.1 Curriculum 2005 (NCS)**

The South African Curriculum 2005 National curriculum Statements (NCS) was underpinned by an outcomes based approach to education (Pudi, 2006:104), and it provided a broad framework for the development of an alternative education system that was open and non-prescriptive. The focus was on two levels of integration. The first level of integration involved the clustering of traditional school subject disciplines

into learning areas and the content from different subjects was integrated around interdisciplinary themes. The second level of integration occurred between school knowledge as embedded in school text books and everyday knowledge as expressed in day-to-day life experiences (Taruvunga and Cross 2012:128).

It was considered to be a learner-centred, result-orientated education system which is based on the belief that individuals have the ability to learn, as well as to demonstrate learning after having completed an educational activity (Fakier and Waghid 2004:55). It relied on the teachers creating their own learning programmes and learning support materials and it aimed at developing all learners to their full potential and helping them to achieve to their maximum ability (DoE, 1997 in Naong, 2008:166). In other words, Curriculum 2005 had its foundation on outcomes. An outcome can be defined as “a culminating demonstration of the entire range of learning experiences and capabilities that underlie it, and it occurs in a performance context that directly influences what it is and how it is carried out” (Cronje, Du Toit, and Motlatla, 2000:466).

Curriculum 2005 encouraged a learner-centred and activity based approach to education. A learner-centred approach “...is concerned with enhancing the possibilities for personal and social integration through the organisation of the curriculum around significant problems and issues collaboratively identified by teachers and young people, without regard for [sic] subject area lines”(Shriner, Schlee and Liber 2010:51).

An outcomes based curriculum requires appropriate teacher training and orientation to the curriculum objectives. Marsh (1993:46); Jansen (2006:329) and Pudi (2007:103), indicated that the training of the teachers in the use of curriculum materials is very important in the effective implementation of the curriculum in the classroom.

Teacher training prior to the implementation of Curriculum 2005 were in the form of once off short term workshops that lacked theoretical foundations (Van Wyk 2013:8). This did little to improve on the teachers experience in a learner-centred approach (Spren and Vally, 2010:48), and as such did not equip them with the necessary tools to confront the new pedagogic challenges in the classroom. The teachers



taught the way they were taught (Spreen and Vally, 2010:47), which was not in line with the stipulations of a learner-centred curriculum.

Professional development is very essential for the acquisition of knowledge to improve on the teachers' curriculum implementation in the classroom. It promotes teachers' confidence and enhances their knowledge of pedagogy (Li, Ni, Li, and Tsoi, 2013:24). If the teachers are poorly trained or if their training is ineffective, it negatively impacts on the curriculum implementation in the classroom, because quality education is dependent on effective teaching by well trained teachers (Singh, 2012:595). This scholar further believes that the role of the teachers in the effective implementation of the curriculum in the classroom should not be overlooked, because the teachers are the ones who deliver the school based curriculum to the learners. This makes their training very important for the curriculum implementation in the classroom.

Singh is not the only scholar who holds the view that ineffective teacher training will lead to curriculum failure: - other scholars like Jacobs and Chalufu (2000:106); Naong (2008:169); and Singh (2012:596), also stressed the importance of effective teacher training in the sound implementation of the curriculum in the classroom. Roehrig, Kruse and Kern (2007:886) and Li, Ni, Li, and Tsoi(2013:24), also mentioned the importance of professional development associated with the understanding and using of the curriculum materials as being effective in improving the teachers' classroom practices. There are other factors which may also affect the teachers' classroom practices.

The teachers' classroom practices may be affected by such factors as classroom overcrowding, especially in township schools, lack of teaching and learning support materials (LTSM), time tables that are not flexible enough to allow for teacher innovation in the classroom (Naong, 2008:171), and the beliefs held by teachers about their role as teachers and how learners learn (Roehrig, Kruse and Kern 2007:885). Kramer, Walker and Brill (2007:529-530), and Walker; Recker; Ye; Robertshaw; Sellers and Leary, (2012:422), indicated that classroom practices may also be affected by the incorporation of new resources, teaching approaches and tools into the teachers' planning, teaching and assessment. This may also have an

influence on the teachers' attitudes towards teaching, because successful implementation of the curriculum depends on the adequate orientation and training of the teachers in the use of new materials and approaches (Mătă 2012:512).

The inadequate orientation, training and development of teachers prior to the implementation of Curriculum 2005 (NCS) contributed to its failed implementation. This view was held by Motseke (2005:65), who emphasised that the poor training of the teachers did not prepare them properly for the implementation of the curriculum. He added that the workshops organised by the Department of Education did not provide the necessary support because either the duration was too short, too theoretical or the facilitators were not too conversant with some of the principles and practices of the new curriculum. In the Life Sciences, there were too many confusing policy documents for the teachers to contend with, and there was a lack of adequate support from subject advisors (Van Wyk, 2013:6).

The importance of adequate training, orientation and support as factors in teacher development prior to curriculum change implementation was also reiterated by Rogan (2004:178), who stated that failed implementation of curriculum changes may well be attributed to the training of the teachers which in some instances may not have been very effective. The underlying factor is that high teacher professional development could facilitate improvement of teaching practices. Another factor that may have led to the failed implementation of Curriculum 2005 was that it emphasised too strongly on procedural forms of knowledge in an effort to do away with the rote learning of propositional knowledge (Mason 2006:138).

#### **2.4.2. The Revised National Curriculum Statements (RNCS)**

The Revised National Curriculum Statements (RNCS) did not represent a paradigm shift from the then existing Curriculum 2005 (NCS) because they were both underpinned by the outcomes based approach to education and training. RNCS was not a replacement for the curriculum 2005; it was an extension of it (Pudi 2007:100). The problems encountered in the implementation of Curriculum 2005 such as skewed curriculum structure and design, lack of alignment between curriculum and assessment policy, inadequate orientation and training of teachers, policy overload and lack of transfer of learning in the classroom (Chisholm, 2003:278) became an

issue that needed to be resolved in order to ensure quality teaching and learning. But this does not seem to be the only problem encountered in the implementation of Curriculum 2005.

There were other problems associated with Curriculum 2005. These included the content selections for the subject curriculum which was left in the hands of teachers (Taruvunga and Cross, 2012:137–138) who were inadequately trained. The traditional and conservative nature of the subject curriculum did not address those outcomes aimed at transformative goals. The teachers used materials they were familiar with (newspapers and other materials) which does not relate to social consciousness or critical awareness to inequality, democracy and transformational goals of the curriculum (Jansen, 1999 in Spreen and Vally, 2010:46).

Due to the challenges of implementation of Curriculum 2005, a curriculum review committee was set up in the year 2000 and tasked with finding solutions to the problems (Bantwini and McKenzie, 2011:6). The solution as was recommended by the committee was the introduction of the Revised National Curriculum Statements (RNCS) grade R–9 in 2002 to streamline the design features of Curriculum 2005, simplifying its language, aligning curriculum and assessment, and improving teacher orientation and training, learner support materials and provincial support (Bantwini and McKenzie, 2011:6). The RNCS had three curriculum design features; firstly, the critical and developmental outcomes (derived from the constitution); secondly, learning outcomes and finally the assessment standard which was grade specific and defined learner attainment for progression (Bantwini and McKenzie, 2011:6) from one grade to the next. The National Curriculum Statements grade 10–12 (NCS) and the Revised National Curriculum Statement grade R–9 (RNCS) was further reviewed and amended in 2011 (DoE, 2011: iii) into a single document called the National Curriculum and Assessment Policy Statements grade R–12 (CAPS).

#### **2.4.3. The Curriculum and Assessment Policy Statements grade R – 12 (CAPS)**

The Curriculum and Assessment Policy Statements Grades R–12 (CAPS), represents a policy statement for teaching and learning in South African schools. This Curriculum is a combination of the previous National Curriculum Statement

grades 10–12 (NCS) and the Revised National Curriculum Statement grades R–9 (RNCS) into a single and amended document (Department of Basic Education, 2011: III). This document constitutes the new Curriculum and Assessment Policy Statements (CAPS) for all subjects and includes the programmes and promotion requirements, as well as the National Policy for assessment for all subjects (Department of Basic Education, 2011:III).

The Curriculum and Assessment Policy Statement grade R to 12 (CAPS), clearly spells out what should be taught and learnt on a term–by–term basis (Department of Basic Education, 2011: IV). In addition, it clearly stipulates the curriculum and assessment policy for all subjects from grade R–12, the programme and the promotion requirements for all the subjects from grade R to 12, and the national protocol on assessment (DBE, 2011: IV). The implementation of the CAPS curriculum was gradual and in phases, starting from 2012 in grade 10 until its final implementation in 2014 for grade 12 in the Further Education and Training band (FET) phase.

The CAPS reaffirmed the reintroduction of textbooks as an integral part of teaching and learning defined by specific subjects rather than learning areas. In the previous curriculum the subject boundaries were not specified, they were defined by learning areas and assessment standards, and the achievement of the learning outcomes (Department of Education, 2003:6), determines the learners' progression through a phase. The training of the teachers prior to the implementation of the CAPS was spaced out for each grade. Spacing as used in the context of this study refers to the distribution of multiple training sessions over time (McDaniel, Padler and Fashler 2013:1), to improve educational outcomes. The first phase of the training process was to prepare the teachers for the implementation of the curriculum in grade 10 in 2012; the second phase of the training prepared the teachers for the implementation of the curriculum in grade 11 in 2013, while the last phase of the training prepared the teachers for the implementation of the curriculum in grade 12 in 2014.

McDaniel Padler and Fashler (2013:2), indicated that training or instruction that is conducted in phases or spaced out, produces a better memory and understanding to the participants (teachers) than when the information is massed and delivered at a

single occasion. The spacing of the training workshops therefore had the potential of improving the memory of the teachers, thereby helping to improve their teaching skills and confidence, in addition to adequately positioning them for effective curriculum implementation in the classroom. In the next paragraph, the Life Sciences CAPS curriculum will be reviewed.

#### **2.4.3.1The Life Sciences CAPS curriculum**

Life Sciences replaced the subject Biology in grades 10–12 in the FET phase since 2006 (De Villiers 2011:537). It provides the learners with useful knowledge and skills needed in everyday life, exposes the learners to biological studies and stimulates their interest and possible career choices. It also provides enough background for the learners to further their careers in any of the biological sciences (DBE, 2011:9).

Life Sciences is a practical-oriented and inquiry based subject and should be taught practically by involving learners in the art of doing (Okoye and Okechukwu, n.d: 288), to enable effective learning. It is the scientific study of living things (biology) from molecular level to their interactions with their environment. It aims at helping learners to develop knowledge of key biological concepts, processes, systems and theories; and an ability to critically evaluate and debate scientific issues and processes; an awareness of South African scientists' contribution; and greater awareness of the benefits of biotechnology and Life Sciences knowledge to humankind (DBE, 2011:8).

The purpose of studying Life Sciences is to help the learner to develop scientific knowledge as well as the understanding of Science's role in the society (DBE, 2011:12). Science equips learners with science process skills, such as observation, interpretation, predicting outcomes, designing an experiment, organisation, and generalisation (Okoye and Okechukwu, n.d: 288), which may be used in everyday life, in the community and work place. The importance of scientific knowledge is that it can help the learners to answer questions about the nature of the living world. Scientific knowledge can guide them towards acting responsibly to the environment, and also helps the learners to better evaluate the role of science in social justice and societal developments. It emphasises the need to use science responsibly in the interest of humankind, society and the environment (DBE, 2011:12). Life Sciences

subject content is grouped into four knowledge areas; these are called “knowledge strands”:

- Life at molecular, cellular and tissue level:
- Life processes in plants and animals:
- Diversity, change and continuity: as well as
- Environmental studies.

The content framework of Life Sciences focuses on ideas, skills and concepts and the connections between them. Prescriptions for practical work and resources that might be used are not provided; rather the teachers have the freedom to adapt their instructional experiences to their local circumstances and availability of materials (DBE, 2011:10). This therefore does not restrict the teachers’ ability to be creative in their classroom practices. The Life Sciences CAPS incorporates a lot of changes in the subject content and assessment procedure; it is therefore very important for the teachers to be adequately trained prior to its implementation if the objectives of the new curriculum are to be realised in the classroom.

Content knowledge changes in the new Life Sciences CAPS curriculum for grade 10 include the introduction of the topic of origin of life. This introduces the learners to the geological time scale of evolutionary trends in the knowledge strand of Diversity, Change and Continuity. Other changes include the inclusion of support and transport systems in plants and animals (knowledge strand of Life processes in plant and animals), which was previously taught in grade 11, and the introduction of the chemistry of life as well as the study of cells and tissues in the knowledge strand of Life at molecular, Cellular and tissue level (DBE 2011:10).

These changes, as indicated in the CAPS document, are aimed at helping the learners to connect what they have learned in Natural Sciences grade 9 with what they will be learning in the Life Sciences grade 10; moreover it introduces the learners to some basic principles related to science. This will familiarise them with a range of skills needed in the course of studying Life Sciences (DBE 2011: 11).

The grade 11 Life Sciences content have also been altered to include only three knowledge strands instead of four. These include; Diversity, Change and Continuity; Life processes in plants and animals and Environmental studies. The content

described in the grade 10 syllabus under Life at Molecular, cellular and tissue level will not be taught in grade 11 (DBE, 2011:11), and the grade 11 environmental studies subject content will only be assessed in grade 12. The school based assessment (SBA) tasks for grade 10–11 Life Sciences has been amended to include: four formal tests (previously two); three practical tasks (previously two); one practical examination (previously none); one mid-year examination (previously same); and one project (previously same) (DBE, 2012:10). A closer look at the amended SBA tasks for Life Sciences grade 10–11 shows a greater emphasis on assessment, which includes self-assessment (DBE 2012:10).

In the next paragraphs, the researcher will discuss the concept of attitudes as an important factor that influences the teachers' classroom practices especially in the Life Sciences. In the researcher's discussions, the effects of attitudes on the teachers' classroom practices will be brought to fore.

## **2.5. THE CONCEPT OF ATTITUDES**

Attitudes can be said to be an evaluative statement concerning situations, objects, people or events which can either be favourable or unfavourable and it is a reflection of how someone feels about something (Robbins, Odendaal and Roodt 2004:72). Accordingly, It can also be defined as a mind-set or a tendency to act in a particular way due to both an individual's experience and temperament; It is an expression of someone's behaviour towards his or her work which can be summarised as either positive or negative (Pickens 2005:44).

In the next paragraph, the researcher will discuss the various theoretical views on attitudes.

### **2.5.1 THEORETICAL VIEWS ON ATTITUDES**

Attitudes provide a simple structure for organizing and responding to an ambiguous and complex teaching environment (Blackman, Conrad and Brown 2012:160). It involves a learned, evaluative responses associated with personal beliefs that in turn influence intentions and behaviours. Such scholars as Collinson (2012:323) describes attitudes as involving a complex interweaving of beliefs and affective responses that influence an individuals' (teachers') worldviews, their decisions and

judgements. In other words, the teachers' attitudes influence their decisions, guide their behaviour and impact what they selectively do in their classrooms (Pickens 2005:48).

An attitude on the other hand can either be a positive or negative feeling or mental state of readiness learnt and organised through experiences that exert specific influence on a person's response to people, objects or situation (Gibson, Ivancevich, Donnelly, and Konopaske 2006:104). In the context of this study, this can be positive or negative feelings of the teachers towards their classroom practices. This suggests that attitudes are learned, and it defines our tendency to interpret a certain situation in a certain way, and it provides the emotional basis for our reactions to certain conditions (Gibson et al, 2006:104). In order to fully understand this concept of attitude, it is important for us also to understand the components of attitudes which are cognition (thought or belief), affect (feeling or emotion) and behaviour (action).

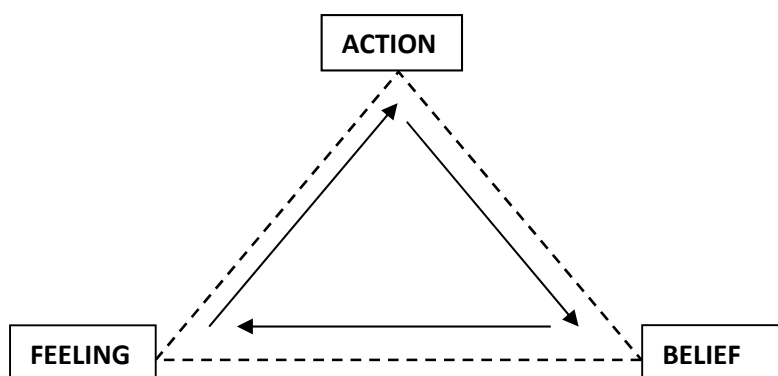
The cognitive component of attitudes defines a person's opinions and beliefs (Gibson et al 2006:105). The evaluative beliefs held by the person (teacher) are an important aspect of the cognitive component because it is expressed as either a positive or negative expression held by the person (teacher) towards an object (classroom practices). Affect is the emotional component of attitudes ;it refers to how we (teachers) feel about issues (Pickens 2005:44) that concern us and our emotional reaction towards changes (Gibson et al 2006:105), in this context, curriculum changes.

The last component of attitude is the action or the behavioural component which refers to the persons' intention to act in a specific manner (Robbins, Odendaal and Roodt 2004:72), as a result of the person's belief or pre conceived thought. In the next paragraph, an example of an attitude is discussed in order to further explain the concept of an attitude.

An opinion, for example, is the cognitive aspect of an attitude; the emotion or feeling towards that opinion is the affect part of the attitude while the tendency to behave in a certain way in relation to that opinion is the behavioural action component of the attitude (Pickens 2005:45). From the above discussions therefore, it implies that the teachers' classroom practices may be influenced by the teachers thought or belief



about the curriculum as well as how he or she feels about it. Figure 2.1 below shows the three interactions between the components of attitudes.



**Figure 2.1 components of attitude (Pickens 2005:45)**

### **2.5.2 TYPES OF ATTITUDES**

Attitudes can be broadly classified into three types, namely; job satisfaction, job involvement and organisational commitment (Robbins, Odendaal and Roodt 2004:72). Job satisfaction refers to an individual's general attitude towards his or her job. Job involvement has to do with how a person is psychologically involved in his or her job; he does his duty based on such elements as attachment, conformity and loyalty as well as acknowledging the organization's goals and willingness to work hard in order to materialize those goals (Robbins et al 2004:73 and Emami, Omidian, Hashemi, and Pajoumnia 2013:7). Organisational commitment refers to the degree to which an individual is committed to his organisation affectively (Robbins et al 2004:73; (Gibson, Ivancevich, Donnelly, and Konopaske, 2006:108:112; and Emami, Omidian, Hashemi, and Pajoumnia 2013:7).

In the next paragraphs, the teachers' attitudes, their attitudes towards curriculum changes and the effects of teachers' attitudes on classroom practices will be discussed.

### **2.5.3 TEACHERS' ATTITUDES**

The attitudes of the teachers can be defined in terms of the process by which they organise and interpret their sensory impression in order to give meaning to their

environment, which may not actually be the objective reality (Robbins, Odendaal and Rood, 2004:109). This means that the teachers' attitude towards their classroom practices may be influenced by their emotions, beliefs, learning and reasoning (Gibson, Ivancevich, Donnelly, and Konopaske 2006: 105), amongst other factors.

Gibson *et al* (2006:105) suggests those teachers' attitudes towards their classroom practices can either be positive or negative depending on their beliefs and emotions towards the curriculum. The teachers' attitudes can either enhance or impede the implementation of reforms (Cagran and Schmidt 2011:172). This suggests that positive teacher attitudes will positively influence classroom practices while negative teacher attitudes will negatively influence classroom practices which may lead to failed implementation of the curriculum because Blackman, Conrad and Brown (2012:160-1), indicated that attitudes are affected and shaped by the quality of preparation and experiences of the teacher.

Teachers' attitudes can also be classified in terms of job satisfaction, job involvement and organisational commitment (Robbins, Odendaal and Roodt 2004:72–73). Teachers with high job satisfaction will have positive attitudes toward their classroom practices (Gibson *et al*, 2006:108), and having positive attitude may result from their belief in their job as teachers (Gibson *et al*, 2006:108). Research has shown that high levels of job satisfaction will obviously lead to less absenteeism (Robbins *et al*, 2004:73). The views of the scholars above therefore suggest that a teacher with high levels of job satisfaction will attend and present excellent classes regularly.

Organisational commitment is another type of attitude (Robbins *et al*. 2004:73); this refers to the level in which the teachers identify with their job as teachers and their willingness to implement the objectives of the curriculum in their classroom. The commitment of the teachers toward their classroom practices may well be influenced by their beliefs and emotions (Robbins *et al*. 2004:108–109).

In the next paragraph, the attitudes of the teachers towards curriculum changes and the various factors that inform their attitudes to curriculum change will be discussed.

### **2.5.3.1. TEACHERS' ATTITUDES TO CURRICULUM CHANGES**

The expectations that come with curriculum changes are that of the teachers' co-operation and positive attitudes towards its implementation (Kim 2009:356). Positive attitudes are believed to influence teaching practice and, in turn, influence learners' learning opportunities and performance (Kim 2009:357). The study conducted in Pakistan, suggests that the truth about curriculum changes is that the teachers are struggling with the implementation of these changes (Ibrahim, Al-Kaabi and El-Zaatari 2013:27). As a result of this, the teachers most often exhibit feelings of resistance to curriculum change implementation (Troudi and Alwan 2010:113). These feelings of resistance towards curriculum change may be as a result of the non-inclusion of the teachers in the curriculum design process (Troudi and Alwan 2010:116) which makes them feel like outsiders in the entire curriculum design process.

The teachers' attitudes towards curriculum changes have an impact on curriculum change implementation (Lee 1998 in Kruger, Won and Treagust, 2013:42) because successful implementation of any curriculum change or reform in education largely depends on the teachers' personal significant attachment to the new situation. The knowledge, experiences, beliefs and perceptions of teachers impacts greatly on their classroom practices (Connelly and Clandinin, 1988 in Kruger et al, 2013:43), as well as the way they adopt the reform efforts (Van Driel, Beijaard and Verloop, 2001 in Kruger et al, 2013:43) and implement it.

Roehrig, Kruse and Kern (2007:885), suggest that classroom practices are directly impacted by an individual teacher's beliefs about teaching and learning. When the teachers' knowledge, experience and pedagogical beliefs (attitudes) are in conflict with the intended curriculum change, it also becomes difficult for it to be implemented successfully (Levitt 2001, in Kruger et al, 2013:43). Research has shown that teachers are resistant to changing their attitudes (Lotter, Harwood, and Bonner, 2007: 1320) to situations they are not aligned with. Remillard (2009:89) indicated that the teachers read, adapt, follow or ignore the curriculum materials as a result of personal and contextual factors. This scholar believes that the teachers' attitudes have an influence on the effective curriculum implementation in the

classroom. This therefore means that, understanding how the curriculum changes affect the teacher's attitude is very important in understanding how the teacher will deliver on the curriculum objectives in the classroom.

In the next paragraphs, the factors that may inform the teachers' negative attitudes towards curriculum changes will be discussed in detail. These factors may include lack of professional development; the teachers' belief system about the curriculum; their affective response (concerns) to the curriculum changes and psychological factors.

#### **2.5.4. POSSIBLE FACTORS INFLUENCING TEACHERS' NEGATIVE ATTITUDES**

Some factors influence the teachers' negative attitude towards the curriculum. In the following paragraphs, the researcher will discuss the influence of such factors as lack of professional development, the teachers' belief about the curriculum, the teachers' concern about the curriculum and psychological factors.

##### **2.5.4.1 Teachers' Lack of professional development**

Teachers experience a vast range of activities and interactions that may increase their knowledge and skills and improve their teaching practice, as well as contribute to their personal, social, and emotional growth as teachers for improved performance in their present or future roles in the school (Desimone, 2009:182). Professional development of the teacher is very important in the implementation of curriculum changes in the classroom (Gibson and Brooks 2012:1) because it allows the teachers to increase their knowledge and develop new instructional strategies needed to effectively implement curriculum changes and improve classroom practices (Desimone 2009:183). Teachers' openness to change was one of the most critical elements of successful curriculum change implementation (Gibson and Brooks, 2012:16).

One of the factors that contribute to the teachers' resistance to curriculum change includes a lack of requisite pedagogical and content knowledge needed to implement the change. Professional development prior to the implementation of curriculum change may improve the teachers' confidence and helps them to embrace the

change. This view is held by Ibrahim, Al-Kaabi and El-Zaatari (2013:29), who posits that when teachers are not adequately provided with professional development prior to a curriculum change, they can easily resist it. In the context of this study, the teachers' lack of pedagogical or content knowledge may contribute to the teachers' negative attitudes towards the curriculum reform. Another important factor raised by these scholars which informs teachers' attitudes to curriculum changes are the frequency of the curriculum changes, because teachers resist the change if they have gone through frequent changes in a limited period of time or if they have witnessed negative effects from previous changes (Ibrahim, Al-Kaabi and El-Zaatari 2013:29).

#### **2.5.4.2 Teachers' beliefs about curriculum change**

The teachers' personal characteristics such as their belief system may play an important role in shaping their attitudes towards curriculum changes (Charalambous and Philippou 2010:1). The belief system in this context can be defined as the teachers' sense of ability to organize and execute teaching that is tailored along the curriculum objectives and promotes learning (Charalambous, Philippou and Kyriakides 2008:126). Teachers who are optimistic about curriculum changes or those whose beliefs are in line with the reform are more likely to be open to new ideas and are more willing to adopt the reform (Charalambous, Philippou and Kyriakides 2008:127) than those whose beliefs are not aligned to the curriculum change. Their beliefs inform their attitude toward the reforms and their willingness to experiment with new teaching approaches and materials (Charalambous and Philippou 2010:3) in their classroom practices. Some teachers also feel that the new curriculum might not help their learners (Ryder and Banner, 2013:509). In this context therefore, it suggests that the self-assurance with which the teachers embrace curriculum changes influences their attitudes towards the implementation of the reform.

For any educational reform effort to be successful, it is necessary to carefully analyse the teachers' beliefs and their content knowledge (Tobin and McRobbie 1996:225; Kruger, Won and Treagust, 2013:43), because it is one of the factors that inform teachers' attitudes to a new curriculum or curriculum change. Roehrig, Kruse

and Kern (2007:885), posits that the persistent and non-dynamic nature of teacher belief systems is a problem even in the process of professional development of the teachers prior to curriculum change implementation.

#### **2.5.4.3 Teachers' perceptions about curriculum change**

Curriculum changes bring a lot of concerns to the teachers which might influence their attitudes regarding the curriculum change implementation. One of such concerns pertains to the teachers' perception about their ability to successfully implement the demands of the new change as well as the pressure related to their daily duties and lack of resources to adequately implement the change (Charalambous and Philippou, 2010:2). This "fear of the unknown" may obviously increase the teachers' resistance to the change or inform their negative attitude to the change. The teachers' attitudes to curriculum change may also be informed by their concern about the influence of the new curriculum on their school culture (Ibrahim, Al-Kaabi and El-Zaatari 2013:28), this usually occurs when the teachers are not sure whether the norms and values represented by change are in agreement with their school culture, otherwise it will be resisted.

#### **2.5.4.4 Psychological factors**

Psychological factors such as feelings of loss, threat, doubt, discomfort, and worries may contribute to the negative attitudes of teachers' towards curriculum changes and increase their resistance to the change (Ibrahim et al 2013:27): These feelings can be associated with feelings of "discomfort" as curriculum change tends to move teachers away from their "comfort" zones. Van Veen and Slegers (2006:106), argue that new dispensations that are unfamiliar to the teachers are always viewed with doubt, and this informs the teachers' reaction to educational reforms. The teachers' reaction to reforms is largely determined by whether they perceive it as a threat to their professional identities or as reinforcement. If the reform is perceived as a threat to their professional identity, it will be resisted.

Teacher resistance or the development of negative attitudes towards curriculum change may also be a result of not including the teachers in the planning process of the reform. This creates a feeling of fear that the reform is being imposed on them

rather than them being part of it (Ibrahim *et al* 2013:33). Moreover earlier knowledge of the reform and inclusion in the process gets them prepared well ahead of the implementation. Furthermore, the stress associated with curriculum change may inform the teachers' negative attitudes towards the change.

## **2.6 THE IMPLICATIONS OF TEACHERS' ATTITUDES ON THEIR CLASSROOM PRACTICES**

Life Sciences teachers' classroom practices are influenced by a multitude of factors including the attitudes of the Life Science teachers. It has been argued that classroom practices are directly impacted by an individual teacher's beliefs and attitudes about teaching and learning (Roehrig, Kruse and Kern 2007:885). In support of this statement, Kim, Tan and Talaue (2013:306) argues that teachers' ideas and beliefs about the current assessment demands influence their perceptions, decision-making and classroom practice consciously and unconsciously. These beliefs directly guide the instructional decisions made by the teacher, and influence their classroom management (Richardson, 1996 in Roehrig, Kruse, and Kern 2007:885). Teaching beliefs and attitudes determines how the teacher handles curriculum materials in the classroom (Tobin and McRobbie, 1996:225 and Roehrig, Kruse, and Kern 2007:886), and their reaction to the implementation of reform materials in the classroom.

Hussain, Ali, Khan, Ramzan, Qadeer (2011:986), hold the view that the teachers' attitudes towards planning, teaching and assessment may be influenced by other factors such as their personal characteristics, dispositions, and gender. Research in Pakistan shows that female teachers have a more positive attitude and are more committed to their classroom practices than their male counterparts (Hussain, Ali, Khan, Ramzan, and Qadeer 2011:989). Flores (in Hussain, Ali, Khan, Ramzan, and Qadeer, 2011:986) has a different view from those of the previous scholars; she believes that factors such as the nature of the workplace, attitude of the principal and the nature of communication within the school may shape the teachers' attitudes towards their classroom practices in addition to economic problems. All the scholars above are of the view that the attitudes of the teachers affect their classroom practices, learners' attitudes and overall academic achievement.

In Life Sciences, some teachers have a negative attitude towards teaching Evolutionary theory, one of the new topics introduced in the Curriculum 2005 (NCS) in 2008 (Sanders and Ngxola, 2009:121). This theory has been accepted by some scientists as a fact (Sanders and Ngxola, 2009:122). Evolutionary theory is regarded as a unifying framework of Life Sciences that describes the origin of life and the changes that occurred in organisms. This theory was proposed by Charles Darwin and continues to be a cornerstone in modern Science (Sanders and Ngxola, 2009:121).

Some South African teachers omit the sections they do not understand or agree with (Sanders and Ngxola, 2009:122); because they believe that it contradicts many fundamental Christian beliefs. Most teachers spend less time teaching this topic than is required, either because they lack the content knowledge or they have misconceptions about it (Sanders and Ngxola, 2009:122). Since teachers determine the quality of instruction in their classroom, it has become very important for them to make professionally responsible instructional curricular decisions (Abrie, 2010:105). This topic of evolution in Life Sciences is one example where teachers' attitudes can have a negative effect on their classroom practices. The teachers' attitudes towards planning and assessment also influence their classroom practices. Chang (2008:2), suggests that planning gives the teachers the necessary directions in the journey through their classroom practices by maximising their best use of available resources to enhance their learners' experiences.

## **2.7 THEORETICAL FRAMEWORK**

This study was informed by the literature on curriculum change implementation and its influence on the teachers' attitudes towards their classroom practices. It is framed by the interpretivist perspective on change implementation and the influence of the change on the teachers' classroom practices. The role of the teacher in the implementation of the curriculum change in the classroom is very crucial to the achievement of the curriculum change objectives (Singh 2012:595). Implementation of curriculum change involves the interpretation of the curriculum policy of which the teachers must figure out whether to ignore, adapt or adopt the change policy (Spillane 2010:145). How the planning, teaching and assessment are carried out



depends on the overall ability of the teachers in terms of their professional development and subject content knowledge, as well as their attitudes toward the curriculum change implementation (Charalambos and Philippou, 2010:2). This suggests that the attitude of the teacher towards the curriculum change amongst other factors plays important role in the successful implementation of curriculum change in the classroom.

Within the general interpretivist viewpoint, a key dimension to the implementation of curriculum change concerns how the teachers understand and interpret the curriculum change policy and how they adapt their mind in response to the change implementation in the classroom (Spillane 2010:145). With its general interpretivist's perspective, interpretivism suggests the existence of multiple realities / knowledge which it seeks to understand and explain rather than passive absorption of knowledge (Mlitwa and Van Belle, 2010:2). How the teachers interpret the curriculum change therefore, depends on how they make sense of it. Bunniss and Kelly (2010:360), stated that, interpretivism "[...] is associated with an interpretive effort to gather a range of in-depth accounts with the aim of building a detailed picture of how a particular phenomenon is understood by those who have personal experience of it". In the context of this study, the focus will be on gathering and interpreting an in-depth account of the effects of curriculum changes on teacher attitudes from the teachers themselves, with the aim of understanding and interpreting the curriculum change and how it influence their attitudes towards their classroom practices.

The ontology of interpretivism is based on the assumptions that: the actions of people are guided by their beliefs and meanings, and that realities are interpreted differently by people based on the circumstances in which they occur (Hay, 2011:169). The actions of Life Sciences teachers in their classrooms may be interpreted differently due to their different beliefs and meanings (attitudes), therefore this study will seek to interpret the different attitudes of Life Science teachers towards curriculum change in relation to their classroom practices, and also try to establish, if any, the relationship on the influence of attitudes on classroom practices.

The epistemology of interpretivism assumes that knowledge is socially constructed and hence can be subjective; this means that there are multiple diverse

interpretations of reality and meaning as constructed in the researcher – participant interactions in the natural environment (Bunniss and Kelly, 2010:361). The understanding of the effects of curriculum changes on teachers' attitudes is important to explaining how it influences their classroom practices (Hay, 2011:169). Understanding entails establishing the beliefs and meanings that inform their actions toward a changed curriculum in relation to their practices in the classroom. Within the context of this theoretical framework therefore, my goal in this study is to understand and interpret the effects of curriculum changes on teacher attitudes and how it influences their classroom practices rather than to generalize and predict cause and effect (Carson *et al*, 2001: 6).

## **2.8. SUMMARY**

This chapter covered the discussions of curriculum change and implementation, teacher attitudes towards curriculum change implementation, and the influence of curriculum change on the teachers' classroom practices.

In the next chapter, the qualitative research design and methodology that was employed in the collection of data towards the study of the effects of curriculum changes on Life Sciences teachers' attitudes and how their attitudes influence their classroom practices will be discussed. The data towards this is obtained through the semi-structured interviews. The rationale for the choice of semi-structured interview as a data collection tool, data storage and analysis, ethical considerations and trustworthiness will also be discussed.

# CHAPTER 3

## THE RESEARCH DESIGN AND METHODOLOGY

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### 3.1 INTRODUCTION

In chapter 2, the literature on curriculum change and implementation, and the influence of curriculum change on the teachers' classroom practices were reviewed and discussed. In addition, the teachers' attitudes and the factors that inform teachers' attitudes to curriculum changes were discussed.

In this chapter, the research design and methodology that was employed in the collection of data in the study of the effects of curriculum changes on Life Sciences teachers' attitudes will be discussed. Teaching involves complex behaviour, therefore a deep understanding of the Life Sciences teachers' attitudes and behaviour is important. A qualitative research method provides a powerful tool to explore those complexities (Clifton and Handy 2001:3). It provides a first-hand account of the Life Sciences teachers' explanation of their behaviours and attitudes (Beirao and Cabral 2007:480) towards curriculum change which may influence their classroom practices. The data collection instruments, sampling procedure, data analysis as well as the ethical considerations applied during the course of this study will also be discussed in this chapter.

In the next paragraph the research paradigm will be discussed by the researcher.

### 3.2 THE RESEARCH PARADIGM

An interpretivist's paradigm is followed in this study. According to Creswell (2007:20-21), interpretivism seeks to understand and interpret the complex views of individuals and the subjective meaning they attach to their experiences. The Life Sciences teachers' views and the meanings they attach to their experience of curriculum changes will be explored. Interpretivism involves an interpretive effort geared towards gathering a wide range of information regarding the effect of curriculum change on Life Sciences teachers' attitudes, with the aim of building a

detailed picture of how curriculum change is understood by the Life Sciences teachers who have a personal experience of it (Bunniss and Kelly, 2010:360). Interpretivism as a paradigm is founded on the existence of multiple realities and knowledge which it seeks to understand and explain (Mlitwa and Van Belle, 2010:2).

The ontology of interpretivism is founded on the theoretical assumption that social reality is based on the beliefs of the individual (Neumann 2003:72). This suggests that the actions of Life Sciences teachers in their classrooms are guided by their beliefs and meanings. This therefore suggests that realities are interpreted differently by different Life Sciences teachers, based on the circumstances in which they occur (Hay, 2011:169). The philosophical theory of knowledge in interpretivism states that knowledge is socially constructed and hence can be subjective; this means that there are multiple and diverse interpretations of knowledge and meaning as constructed in the researcher–participant interactions in the natural environment (Bunniss and Kelly, 2010:361). Therefore the relationship between the researcher and the participant in terms of what they understand, will be communicated and discussed within the social settings and the cultures in which they occur (Neumann 2003:72).

The qualitative research methodology will be discussed in the next paragraph.

### **3.3 THE QUALITATIVE RESEARCH METHODOLOGY**

The research design is the structural framework that guides the researcher in the planning and implementation of the research study; it also helps the researcher to achieve optimal control over the factors that could influence the study (Burns and Grove, 2005:211). The research design, according to Polit and Beck (2004:731), also involves a detailed plan for addressing the research question and achieving the research objectives. As was indicated in Chapter 1, this study aims to achieve these objectives;

1. To understand and interpret the influence of curriculum changes on the Life Sciences teachers' attitudes.
2. To understand and interpret the influence of the curriculum change on the teachers' classroom practices.

3. To develop an account of how curriculum changes shape teachers' attitudes and practices.
4. To formulate recommendations and/or guidelines that will equip teachers with the necessary knowledge to deal with curriculum changes and enhance their classroom practices.

These objectives were deduced from the following research questions;

1. How have the changes to the Life Sciences curriculum affected the teachers' attitudes?
2. How have the attitudes of the teachers to the changes in the Life Sciences curriculum affected their classroom practices, if at all?
3. How can the effect of curriculum changes on teachers' attitude, if any be understood?
4. What suggestions and / or recommendations can be made to address the effects of curriculum change on teachers' attitudes, if any?

The research methodology describes the research process and the kind of tools and procedure that will be employed in the research, it also emphasise the individual steps in the research process and the most objective procedure to be employed (Major and Savin-Baden, 2010:128). The case study is the research methodology employed in this study. Baxter and Jack (2008:545) indicated that case study design should be considered when the focus is to answer 'how' and / or 'why' questions in a research study. This design will enable the researcher to gather comprehensive information from Life Sciences teachers on the effect of curriculum change on teachers' attitudes and its influence on their classroom practices with regards to their schools' consistent 100%, below 70% and below 50% performance in Life Sciences at the National school certificate examinations (NSC) over the last five years.

Qualitative research interviews are employed in this case study because it has the advantage of allowing the Life Sciences teachers to express their views about curriculum change and how it influences their classroom practices (Beirao and Cabral 2007:480). It also provides a means of obtaining a wide range of data from a

relatively small sample of Life Sciences teachers (Beirao and Cabral 2007:480). Semi-structured interviews are the qualitative data collection instrument (Tracy and Robles, 2010:180) which was employed in the collection of data for this study.

The aim of this study therefore is to investigate the effects of curriculum changes on the Life Sciences teachers' attitudes and its influence on their classroom practices. The research design is used to provide data to address this aim.

### **3.3.1 THE RESEARCH LOCATION**

This research was conducted in three secondary schools designated "school A", in Thaba Nchu, "school B" in Botshabelo and "school C" in Bloemfontein, all in the Motheo district of the Free State. Sampling will be discussed by the researcher in the next paragraphs.

### **3.3.2 SAMPLING**

Sampling is an important step in the research process because it determines the quality of inferences made by the researcher which arise from the findings of the research (Onwuegbuzie and Collins, 2007:281).

#### **3.3.2.1 Sample**

A sample, according to Polit and Beck (2012:291), consists of a selected group of people or elements in a defined population from whom the most basic unit of information can be collected. The sample in this study therefore consists of Life Sciences teachers who have taught Life Sciences for at least four years with the old NCS curriculum and are currently teaching Life Sciences with the new CAPS curriculum. This is to ensure that the participants meet the criteria that enable the researcher to answer the research questions and address the objectives of the study.

The researcher employed purposive sampling procedure in this study. According to Burns and Grove (2005:532), purposive sampling is the conscious selection of participants to be included in a study. This means that the researcher consciously selected the participants who will provide him with the relevant information needed to conduct the research study and provide meaningful inferences.

Purposive sampling is a non-probability sampling or purposeful sampling procedure, which involves selecting certain participants based on a specific purpose rather than randomly (Treddlie and Yu, 2007:80). It is designed to generate a sample that will address the research questions as well as specific purposes related to the research questions and it focuses on the depth of information provided by the participants. Based on this, the researcher selected the participants he can learn the most from (Treddlie and Yu, 2007:84) regarding the effect of curriculum changes on teachers' attitudes and how their attitudes influence their classroom practices.

### **3.3.2.2 Sample size**

In this qualitative research, the sample size represents the number of participants selected by the researcher to participate in this study (Onwuegbuzie and Collins, 2007:281). The choice of sample size is important in this research because it determines the extent to which the researcher can make analytic generalizations (Onwuegbuzie and Collins, 2007:287). According to Burns and Grove (2005:358), the size of the sample in qualitative research is usually limited because of the rich data obtained and the extent of exploration of the phenomenon being studied during the interviews.

In this study therefore, the sample size consists of three Life Sciences teachers selected from a population of six schools in the Motheo district of the Free State that are offering Life Sciences as a school subject. This defined population of six schools are further classified into three categories based on their academic performances in the National School Certificate Examination (NSCE). The reason for this is to enable the researcher to have adequate sample for content validity (Francis, Johnston, Robertson, Glidewell, Entwistle, Eccles and Grimshaw 2010:1230).

The first category consists of schools which have consistently performed at 100% pass rate; the second category consists of school that have performed above 50% but below 100% pass rate; while the last category consist of schools that have performed below 50% pass rate. This is to ensure that the sample is evenly distributed in order for the result of the study to reflect trustworthiness which involves credibility, dependability, and confirmability (Sinkovics, Penz, and Ghauri, 2008:689).

Six Life Sciences teachers were initially invited to participate in the semi-structured interviews to share their personal experiences on the effect of curriculum changes on teachers' attitudes, and how their attitudes influence their classroom practices, however only three teachers participated. The other three Life Sciences teachers withdrew their participation citing various personal reasons. The participants were selected according to their demographic schools' performance in the National School Certificate Examination (NSC). One participant was selected from each of the categorized schools mentioned in the previous paragraphs.

The semi-structured interviews were held over two sessions; the first session was for schools in Botshabelo and Thaba Nchu, while the second session was for the school in Bloemfontein.

For the purpose of this study the participants met the following criteria for participation; they are Life Sciences teachers who have been in the teaching profession for at least four years (in order to have had experience of the old and the new curriculum), they are currently teaching the subject in grade 10 to 12 (FET band), and the academic performance of their schools in the NCS examination falls within the stipulated academic performances mentioned in the previous paragraphs.

### **3.3.3 DATA COLLECTION**

According to Kvale (2005:89), qualitative research interviewing has become a sensitive and powerful method of data collection. Interviews, according to this scholar can be classified as a dialogue. A dialogue is an interchange of views between two or more individuals with the aim of discussing a theme of mutual interest which arise from the participants' experiences. According to Creswell (2007:115), there are five steps involved in the collection of data, these include; the selection of the participants, gaining access and obtaining permission, building rapport with the participants, generating and recording data and data analysis. The selection of the participants, gaining access and rapport building were earlier discussed in the previous paragraphs whereas in the next paragraph, the generation of data through semi-structured interview will be discussed by the researcher.



### **3.3.3.1 THE SEMI-STRUCTURED INTERVIEWS AS QUALITATIVE RESEARCH INSTRUMENTS**

Interviews are discussions, usually one-on-one, between the interviewer and the participant aimed at gathering information on a specific set of topics (Harrell and Bradley, 2009:6). A qualitative interview is a flexible and powerful tool to capture the voices and ways in which the Life Sciences teachers make meaning of their experiences of curriculum changes and how it affects their classroom practices (Rabionet, 2011:563).

Qualitative interviews according to Tracy and Robles (2010:180) tend to adopt an interpretive stance to social reality, therefore assuming that reality is not there to be straightforwardly recorded into structured answer categories but it focuses attention on developing questions that will elicit rich, elaborate responses from the participants. Since no two participants' responses are quite the same as the other, qualitative researchers quote participants' responses rather than counting them (Tracy and Robles, 2010:180).

During this study, the researcher conducted semi-structured interviews with three grade 10 – 12 Life Sciences teachers in order to understand their views on the effect of curriculum changes on their attitudes, and how their attitudes influence their classroom practices. The rationale behind the preference for semi-structured interviews will be discussed in section 3.3.31a. The open-ended questions (see annexure E) were verbally presented to the participants during the interviews, and their rich and elaborate responses on the effects of curriculum changes on their attitudes and its influence on their classroom practices were recorded with their permission.

The questions posed to the participants were related to their feelings, beliefs and actions regarding the effect of curriculum changes on their attitudes and its influence on their classroom practices. In table 3.1 in section 3.3.3.1d the objectives of the research addressed by the semi-structured interview questions were discussed. The data obtained related directly to the participants' beliefs, perceptions, attitudes and practices which addresses the objectives of this research. The researcher focused

on the responses of the participants and in some cases probed them for more information based on their experiences as Life Sciences teachers. The researcher's further probes were devoid of any manipulative or "subtle therapeutic" techniques aimed at getting beyond the participants' defences in an attempt to obtain information from them (Kvale, 2005:93).

Although the researcher is supposed to play an active role in the semi-structured interviews, he attempted to minimize his control over the course of the interviews by allowing the participating Life Sciences teachers to tell their stories in their own way (Park, 2008:310). The main aim of the semi-structured interviews is to provide information which enables the researcher to understand and interpret the personal experiences of the Life Sciences teachers and their responses (O'Reilly, 2005:132) which is relevant to the phenomenon being studied.

The semi-structured interviews were conducted at the participating schools on two days (25<sup>th</sup> and 27<sup>th</sup> March, 2014). The interviews were scheduled during the teachers' free periods in order to minimize academic disruptions during tuition times. During the interviews, the researcher followed the prescriptions outlined by Babbie (2010:276-7), to ensure successful interviews. The researcher was also familiar with the questions he asked in order to save time.

In the next paragraphs the rationale behind the choice of the semi-structured interviews as the data collection instrument for this study will be discussed.

#### **3.3.3.1 (a) The rationale behind the choice of semi-structured interviews**

Primary data collection is an essential piece of this research, and using proper techniques ensures that qualitative data is collected in a scientific and consistent manner (Harrell and Bradley, 2009:2). The researcher employed semi-structured interviews in this study in order to enhance the collection of data in a scientific manner and also to enhance the accuracy, validity, and reliability of the research findings (Harrell and Bradley, 2009:2).

The use of semi-structured interviews in this study allows for flexibility in the type of information being collected. There are ample opportunities for clarification, explanation and elaboration on questions and responses of the participants (Clifton

and Handy, 2001:8). The researcher employed semi-structured interviews in order to delve deeply into the topic of the study and thoroughly understand the answers that are given (Harrell and Bradley, 2009:27) by the participants. The researcher asked probing, open-ended questions in order to further understand the independent thoughts of the Life Sciences teachers on the research topic (Wholey, Hatry and Newcomer, 2010:367).

In this study, semi-structured interviews were employed by the researcher to ask the participants questions that provided greater opportunity for them to organize their answers within their own frameworks (Wholey, Hatry and Newcomer, 2010:367). The researcher asked the participants the type of questions that enabled him to gather information on topics that relate to the phenomenon being studied (Tracy and Robles, 2010:180). The privacy accorded the participants by the semi-structured interviews enabled the researcher to elicit from them information relevant to answering the research questions (Rabionet, 2011:564).

The interview techniques employed by the researcher in the semi-structured interviews enabled the researcher to gather a lot of information from the Life Sciences teachers on the research topic. It provided access to opinions and attitudes of the teachers towards curriculum changes. It was also effective in gaining insight into problems that are not immediately perceptible, but that nonetheless may cause concern in certain areas of education (Laforest, 2009:1).

Semi-structured interviews enabled the researcher to collect detailed information in a conversational style which enabled the researcher to understand the participants' point of view on the research topic rather than making generalisations about their attitudes (Harrell and Bradley, 2009:27). It also enabled the researcher to prepare ahead of time and appear competent during the interviews (Cohen and Crabtree, 2006:1).

Semi-structured interviews allowed the participants the freedom to express themselves in their own way. The participants were able to talk about something in detail and depth. The meanings behind an action were revealed as the participants spoke for themselves with little direction from the researcher. It provided reliable,

comparable qualitative data and also provided ample information or data for the study from a relatively small sample (Cohen and Crabtree, 2006:1).

In the previous paragraphs, the researcher discussed the rationale behind the choice of semi-structured interview as a data collection tool for this study. In the next paragraph the weaknesses of semi-structured interviews as a data collection tool in a qualitative research will be discussed by the researcher.

#### **3.3.3.1 (b) Weaknesses of semi-structured interviews**

The weaknesses of semi structured interviews, according to Wholey, Hatry and Newcomer (2010: 366) are that this type of interview technique is labour intensive and may require interviewer sophistication to achieve a successful interview. The researcher was smart, sensitive, poised and knowledgeable about the relevant issues discussed during the interview. Furthermore, the process of preparing, setting up, conducting and analysing the interviews was time consuming.

In the next paragraphs, the prescriptions to be followed when conducting semi-structured interviews as a data collection tools will be discussed.

#### **3.3.3.1 (c) Prescriptions to be followed during interviews**

According to Babbie (2010:276), an interview should follow a number of procedures in order to elicit rich information from the participants. In line with Babbie's suggestion that the interviewer should be familiar with the questions he asks, the researcher was familiar with the questions he asked the participants in order to save time. He followed the question wordings exactly in order for the participants to interpret the questions exactly as intended by the objectives of the study (Babbie, 2010:277). Accurate recording of the responses was made especially in open-ended questions, so also is the use of probes to further elicit some of the responses the participant may have omitted.

In the next paragraph, the research objectives addressed by each semi-structured interview questions will be discussed.

### 3.3.3.1 (d) The semi-structured interview questions and the corresponding research objectives addressed

In order for the study to effectively address the research objectives and answer the research questions, the semi-structured interview questions were formulated to align with the research objectives. The table below summarises the alignment of the first two research objectives to the semi-structured interview questions (see section 3.3), the other objectives will be addressed by the outcome of the study in chapter five.

**Table 3.1 Table showing the alignment of the semi-structured interview questions to the research objectives**

<b>RESEARCH OBJECTIVE 1: Effect of curriculum change on teacher attitudes.</b>	<b>RESEARCH OBJECTIVE 2: Effect of teacher attitudes on classroom practices</b>
<ol style="list-style-type: none"> <li>1. Are you up-to-date with the necessary content knowledge in Life Sciences? If not in which topics do you need support?</li> <li>2. Is the new Life Science CAPS curriculum providing you with any challenges?</li> <li>3. If so which parts of the CAPS curriculum contents provide you with the biggest challenge?</li> <li>4. Are the challenges related to your inadequate knowledge of the contents?</li> <li>5. What do you think about the assessment system prescribed by the CAPS?</li> <li>6. Do you adhere strictly to the prescription policy on assessment by the CAPS? If not, why?</li> <li>7. What is your attitude towards the new Life Sciences CAPS curriculum?</li> </ol>	<ol style="list-style-type: none"> <li>10. Are you confident enough in teaching Life Sciences?</li> <li>11. Do you think the Life Science curriculum relates to the everyday lives of the learners?</li> <li>12. Do you look forward in anticipation when you have to present Life Sciences classes?</li> <li>13. Are you up-to-date with your planning?</li> <li>14. Do you regard planning as an important part of education?</li> <li>15. How much time do you spend on planning each week?</li> <li>16. Does your attitude affect your planning?</li> <li>17. Are you up-to-date with your assessment?</li> </ol>

<p>8. Which factors influence your attitude towards the new Life Science curriculum? Elaborate</p> <p>9. Does your attitude affect your assessment?</p>	<p>18. Does your overall attitude to the new curriculum influence your classroom practices at all? If so how?</p>
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### **3.3.3.1 (e) Motivations for the choice of questions for the semi – structured interviews**

In order to understand and interpret the influence of curriculum change on the Life Sciences teachers' attitudes, which is the first objective of this study, it became important for the researcher to ask questions on whether the Life Sciences teachers possess the necessary content knowledge needed to teach Life Sciences as reflected in question 1 in Table 3.1. According to Shippen, Crites, Houchins, Ramsey, and Simon, (2005:14), content and pedagogical knowledge are two of the factors that may contribute to attitude development and change among teachers. Moreover, the teachers' personal characteristics and capacities may also inform their negative attitudes towards curriculum change implementation (Charalambous and Philippou, 2010:1). According to Gibson and Brooks (2012:1), inadequate content knowledge due to a lack of professional development may interfere with the teachers' ability to implement curriculum change in the classroom, because adequate content knowledge is essential for successful curriculum change implementation in the classroom (Mata, 2012:515).

Interview questions 2, 3 and 4, in Table 3.1 focus specifically on the new Life Sciences curriculum content. These questions seek to establish whether the new Life Sciences curriculum content provides the Life Science teachers with any form of challenges as well as whether the parts of the curriculum that provide the most challenges are related to inadequate content knowledge of the teachers. The rationale behind these questions are that, challenging content may inform negative attitudes of the Life Sciences teachers towards the curriculum due to feelings of professional disempowerment (Priestly, 2011:1). According to Blackman, Conrad and Brown (2012:160-1), attitudes are affected and shaped by the classroom

practices and experiences of the teacher. Effective teacher education therefore is important in bridging the gap between what is taught and what is not taught in the classroom.

Questions 5 and 6 in Table 3.1 focus on the assessment systems prescribed by the new curriculum and whether the teachers adhere to the assessment policy. Assessment is very important in the implementation of the curriculum (Wood and Butt, 2014:5), and the teachers' beliefs about assessment may inform their attitude towards the assessment policy prescribed by the curriculum (Charalambous, Philippou and Kyriakides, 2008:126).

Finally, questions 7, 8 and 9 focus on the teachers' general attitudes towards the new Life Sciences curriculum, the factors that influence their attitudes and the possible influence of their attitudes on their assessment. These questions were included because they enable the researcher to understand from the Life Sciences teachers themselves whether they have developed positive or negative attitudes towards the new curriculum, the main factors influencing their attitudes as well as the effect it may have on their assessment. Studies conducted by researchers indicate that positive teacher attitudes may positively influence their classroom practices and learner outcomes (Blackman, Conrad and Brown, 2012:160). According to Blackman, Conrad and Brown (2012:161), attitudes may be shaped by personal experiences and emotions of the teacher, and the views and attitudes of teachers are critical to curriculum change implementation (Dyson, Howes and Roberts, 2004 in Blackman *et al* 2012:160).

In the paragraphs below, the semi-structured interview questions that address the effect of the Life Sciences teachers' attitudes on their classroom practices, which forms the objective 2 of the study will be discussed by the researcher.

In question 10 in table 3.1, the researcher seeks to understand from the Life Sciences teachers themselves how confident they are when presenting classes. This question is very important because Life Sciences teachers who are not confident to teach the subject may develop negative attitude towards the curriculum and their classroom practices. They may also exhibit feelings of resistance towards curriculum change implementation because of incompetency (Troudi and Alwan 2010:113).

Question 11 in table 3.1 focuses on the relationship of the new curriculum to the everyday lives of the learners. A curriculum that relates to the learners' everyday lives may contribute to improving the teachers' classroom practices because it exposes the learners to real world situations which may enhance their cognitive abilities. According to Park (2008:309), learners learn best when they are exposed to real life situations.

Being enthusiastic about the lesson and looking forward to its presentation will signify the teachers' positive attitudes to their classroom practices. This is the basis of question 12 in table 3.1. The researcher asks whether the Life Sciences teachers look forward in anticipation when they have to present Life Sciences lessons. This question enables the researcher to understand how positive attitudes of the teachers towards their lesson presentation positively influence their enthusiasm during their lesson presentation. (Kim, 2009:357).

The next questions, 13, 14, 15 and 16 in table 3.1 are aimed at determining the teachers' attitudes towards planning of their classes and learning activities. The Life Sciences teachers were asked if they were up-to-date with their lesson planning, whether they regard planning as an important part of education, how much time they spend planning their lessons each week, and whether their attitude influence their lesson planning. The responses of the teachers towards these questions might enable the researcher to understand how important the teachers regard planning and how it affects their classroom practices, because planning is one of the factors that contribute to attitude development and change among teachers (Hastings and Oakford, 2003 in Blackman, Conrad and Brown 2012:161).

Question 17 in table 3.1 is structured to enable the researcher to understand if the Life Sciences teachers have positive attitudes towards their assessment. This question relates to the earlier questions 13 to 16 on planning, because planning, teaching and assessment constitute the teachers' classroom practices (Singh, 2012:595). Understanding how the teachers assess their learners enables the researcher to interpret their attitudes towards their classroom practices. Moreover, attitudes held by teachers affect the learners' academic achievements and behaviour (Jeon and Peterson, 2003 in Blackman, Conrad and Brown 2012:160).



Finally, in question 18 in table 3.1, the researcher seeks to understand from the Life Sciences teachers how their attitudes generally influence their classroom practices. According to Blackman *et al* (2012:161), attitudes provide a simple structure for organising and responding to a complex environment. This suggests that the overall attitude of the Life Science teachers towards curriculum changes may influence their classroom practices, and affect the learners' academic achievement and behaviour (Jeon and Peterson, 2003 in Blackman *et al* 2012: 160).

### **3.4 DATA STORAGE AND ANALYSIS**

The semi-structured interviews were audio-recorded and assigned interview codes and dates. The permission to record the interviews was sought and obtained from the participants. Later the recorded interviews were copied onto a Universal Serial Bus (USB) storage device to preserve the data. The USB device was securely stored in a locked drawer for safe keeping. The researcher replayed the recorded interviews, and made notes of the participants' responses. Transcription of keywords, phrases and statements were also made (Seale 2004:48).

In order to ensure that the data collected is not tampered with until the data analysis stage of the study, the storage folders were labelled SSI-25-0314 and SSI-27-0314 (the abbreviation SSI stands for semi-structured interviews and the numbers represent the respective dates when they were conducted). Finally all transcripts will be shredded and destroyed as soon as the reports and results are finalized and published.

Data analysis in this qualitative research is a process of making sense of relevant information gathered from Life Sciences teachers during the semi-structured interviews and responsibly presenting what the results reveal (Wholey, Hatry, and Newman, 2010:417). According to Brink, Van der Walt and Van Rensburg (2012:170), data analysis is a process of systematically organising, categorising, summarizing and describing the data obtained in this study in a meaningful way in order to answer the research questions. This qualitative data analysis is a means of making meaning of the Life Sciences teachers' words and actions in a non-mathematical manner. The semi-structured interviews conducted during this

qualitative study were organised and categorised for easy access during the data analysis.

This qualitative data analysis, as described by Polit and Beck, (2004:570), involves the integration and synthesis of data with the aim of drawing conclusions and communicating findings in a manner that preserves the richness of the data obtained from the Life Sciences teachers. Accordingly, Seidman (2013:87) suggested that the analysis of data obtained by means of interviews should be done as soon as the interviews are completed in order to avoid any interference with the interviewing processes.

In line with Seidman's suggestion, the researcher commenced with the analysis of the semi-structured interview data after the interviewing process was completed. The researcher repeatedly listened to the recorded interviews and transcribed it. The transcripts were then compared with the recordings to ensure that they reflect what was contained in the audio- recorded interviews.

During the transcription of the recorded interviews, words were transcribed using conventional spelling that does not indicate pronunciation. Repeated words like 'mm', 'eish' and 'aha' and back channel utterances were ignored. Passages that were not very clear were refined, and conventional punctuations were used to represent pauses, pace or intonation. The above mentioned procedure reflects the conventions stipulated by Seale (2004:73). This convention was applied because it saves time and makes the transcribed text readable.

As was earlier mentioned in chapter 1, two coding procedure was applied to the raw data. Open coding was applied to identify the general areas of interest that are related to the research questions (Babbie, 2010:401-2). In order to uncover, name and develop concepts, the researcher opened up the texts to reveal the thoughts, ideas and meanings contained therein (Strauss and Corbin, 1998:102; Babbie, 2010:401). This was done by first listening to the responses from each participant in the semi-structured interviews, taking notes, breaking down the data into discreet parts, closely examining and comparing them for similarities and differences. Events, happenings, objects and interactions that were found to be conceptually similar were grouped together into categories.

Axial coding is the next line of the coding process that the researcher applied to the raw data. Axial coding interprets the meaning of the responses from the participants that are core to the study. It involves the grouping of the data using the open code categories to uncover the meanings of the participants' responses which identifies the relationships between the themes of the study (Strauss and Corbin, 1998:103; Gray, 2004:331; Babbie, 2010:402). The coding processes focused on the responses that are relevant to the research questions.

### **3.5 EMERGING THEMES IDENTIFIED**

The transcription of the data obtained during the semi-structured interviews conducted with Life Sciences teachers was done, and the findings of the study are organised into emerging themes. The themes emerged from the answers of the participants to the semi-structured interview questions. Efforts are made to present "thick and detailed" description of the findings that emerged from the study. The direct answers from the participants were compiled into emerging themes in order to expose the data and compare the similarities and differences with the literature studied. The following themes listed below have emerged from the analysis of the semi-structured interviews.

- (i) Theme 1: The influence of curriculum change on teachers' attitudes
- (ii) Theme 2: The influence of attitudes on classroom practices
- (iii) Theme 3: How curriculum change shape teachers' attitudes and Practices

The themes are sub divided in sub-themes and categories to further elaborate on the findings of the study (Grossoehme, 2014:116: Strauss and Corbin, 1998:102). The various themes, subthemes and categories which will be analysed, compared and interpreted in Chapter 4 are presented in the table below.

**Table 3.2 Themes, subthemes and categories that emerged from the data**

<b>Theme 1</b>	<b>Subthemes</b>	<b>Categories</b>
The influence of curriculum change on teachers' attitudes	Teachers' attitudes towards curriculum change	Beliefs and Perceptions
	Adequate content knowledge	
	CAPS curriculum for Life Sciences	

<b>Theme 2</b>	<b>Subthemes</b>
The influence of teachers' attitudes on classroom practices	The influence of planning on teachers' attitudes
	The influence of assessment on attitudes and classroom practices
	Teachers' attitudes towards classroom practices.

<b>Theme 3</b>	<b>Subthemes</b>
How curriculum change shape teachers' attitudes and practices	Positive teacher attitudes towards the CAPS curriculum and classroom practices
	The need for professional development.

### 3.6 ETHICAL CONSIDERATIONS

According to Thompson and Russo (2010:33), ethics are moral principles and values which guide action. These scholars further describe the concept of research ethics as focusing on the moral principles specifically needed to guide scientific research. Ethics is very important in qualitative research, because the researcher have ethical obligation to the people he conducts the study with. The researcher is positioned as relatively more powerful than the researched in terms of power relations, therefore the researched feels more vulnerable (Brinkmann, 2007:129), hence the need to adequately protect their right to anonymity. In view of this, it therefore becomes very important for me as a researcher to be mindful of the rules, laws and codes of

conduct which determine how I should behave whilst conducting this research. I am duty bound to act ethically with regard to the participants by ensuring that the integrity of the research is maintained (Stutchbury and Fox, 2009:489).

In view of the above ethical considerations, the researcher used pseudonyms A, B and C to represent each of the Life Sciences teachers who participated in the study. Informed consent of the participants (see annexure D) was obtained through a letter written to inform them in advance about the study and the possible implications the study might have on them. The participation of all participants in this study was voluntary. Their voluntary participation was acknowledged at all times. The participants were assured that their identities, the information they provided, as well as their schools' names will be kept confidential.

Permission to conduct the study was sought and obtained from the Free State Department of Education (Annexure B), which adds legitimacy to the study, and saves time that would have been spent explaining and justifying the study (Wholey, Hatry and Newcomer, 2010:369). Further permission was also sought and obtained from the principals of the participating schools (Annexure C), where details of time and duration of the interviews as well as any mitigating factors were explained. Informed consent letters were also given to individual participants informing them of the details of the interviews (Annexure D) while seeking their voluntary participation.

Access to the research location was sought through a letter addressed to the Motheo district authorities detailing the purpose and duration of data collection for the study, as well as letter of permission addressed to the various principals of the designated schools (Annexure C).

### **3.7 TRUSTWORTHINESS**

Trustworthiness in qualitative research encompasses such issues as credibility, dependability, transferability and conformability (Sinkovics, Penz, and Ghauri, 2008:689). According to Williams and Morrow (2009:576-579), trustworthiness involves the ability of the researcher to demonstrate that he has established a rationale for the study, a clear description of the data collection procedure, data analysis method and a clear description and interpretation of data. In ensuring

trustworthiness for this study, the rationale for the study was clearly established. In this chapter, the data collection and analysis procedure as well as how the data collected will be interpreted was also clearly stated.

Furthermore, trustworthiness involves the achievement of integrity, balance between reflexivity and subjectivity as well as clear communication of the research findings (Williams and Morrow 2009:577). In order to ensure that integrity is achieved in this study, the participants were only selected from a group of Life Sciences teachers who have taught Life Sciences in the NCS and CAPS dispensations, and they voluntarily participated. The semi-structured interview process was conducted while making sure that the teaching hours of the teachers were not infringed upon, and their consent was sought and granted before audio recordings were made.

To ensure that there is a balance between the participants' voices (subjectivity) and the researcher's interpretation of their meaning (reflexivity), the participants' feedback was sought during the analysis and interpretation of the research findings. The participants were allowed to listen to their various responses individually and comparison was made between their responses and the researcher's transcribed interpretation to ensure that they were not quoted out of context. The input from the participants helped the researcher to best interpret their responses more correctly. The clear communication of research findings, according to Williams and Morrow (2009:580), makes a research trustworthy. The outcome of this study will be clearly communicated in writing.

### **3.8 SUMMARY**

In this chapter, an investigation into the effects of curriculum change on Life Sciences teachers' attitudes and its influence on their classroom practices was conducted. The research design and methodology employed in the collection of data to address the objectives of the research was qualitative. The data collection procedure through semi-structured interviews, the choice of semi-structured interviews as the preferred method of data collection, and how the data obtained was stored were also discussed. In addition, the ethical considerations observed in the course of this study were discussed. The data obtained from the Life Sciences teachers during the semi-structured interviews will be critically analysed, compared,

interpreted and integrated with the information gained through the literature study in the next chapter.

# CHAPTER 4

## ANALYSIS, INTERPRETATION AND COMPARISON OF THE RESEARCH FINDINGS

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### 4.1 INTRODUCTION

In the previous chapter, the researcher discussed the research design and methodology employed in the collection and storage of data obtained during the semi-structured interviews. The interviews were conducted with a selected group of Life Sciences teachers from three different schools in Thaba Nchu, Botshabelo and Bloemfontein, all in the Motheo district of the Free State, on how curriculum changes influence their attitudes as well as their classroom practices. In this chapter, the qualitative data gathered from the Life Sciences teachers will be analysed, interpreted and compared with the information obtained from the literature study. The researcher will try to establish whether there is a correlation between the views of the Life Sciences teachers who participated in this study and the information obtained from the literature study. The research questions will be addressed and in the next paragraph, the researcher will discuss the analysis of the semi-structured interviews.

### 4.2. ANALYSIS AND INTERPRETATION OF THE SEMI-STRUCTURED INTERVIEWS

In this section, the results of the semi-structured interviews analysis will be presented. The researcher adopted Tesch's method which is cited in Creswell (2007:192), in the analysis and interpretation of data. This method suggests the following steps, the researcher carefully read through the transcribed text to get a sense of the whole interview, topics were identified and grouped together, similar topics were grouped together and categorised, the data list was compared and the most descriptive wording for the topics was used to transform them into a category. The data which belong to the category were assembled in one place as the subthemes and preliminary data analysis was performed. (Grossoehme, 2014:116).



The analysis of the responses from the participants was subsequently compared to the research questions to establish whether it addressed the questions.

#### **4.2.1 The emerging themes of the study**

As was discussed in chapter 3, the transcription of the data obtained during the semi-structured interviews conducted with Life Sciences teachers was done, and the findings of the study were organised into emerging themes. In this section, “thick and detailed” descriptions of the findings that emerged from the study will be presented. The direct answers from the participants were compiled into emerging themes in order to expose the data and compare the similarities and differences with the literature studied. The following themes listed below have emerged from the analysis of the semi-structured interviews.

- (iv) Theme 1: The influence of curriculum change on teachers’ attitudes
- (v) Theme 2: The influence of teachers’ attitudes on their classroom practices
- (vi) Theme 3: How curriculum change shape teachers’ attitudes and practices

The themes are sub divided into sub-themes and categories to further elaborate on the findings of the study.

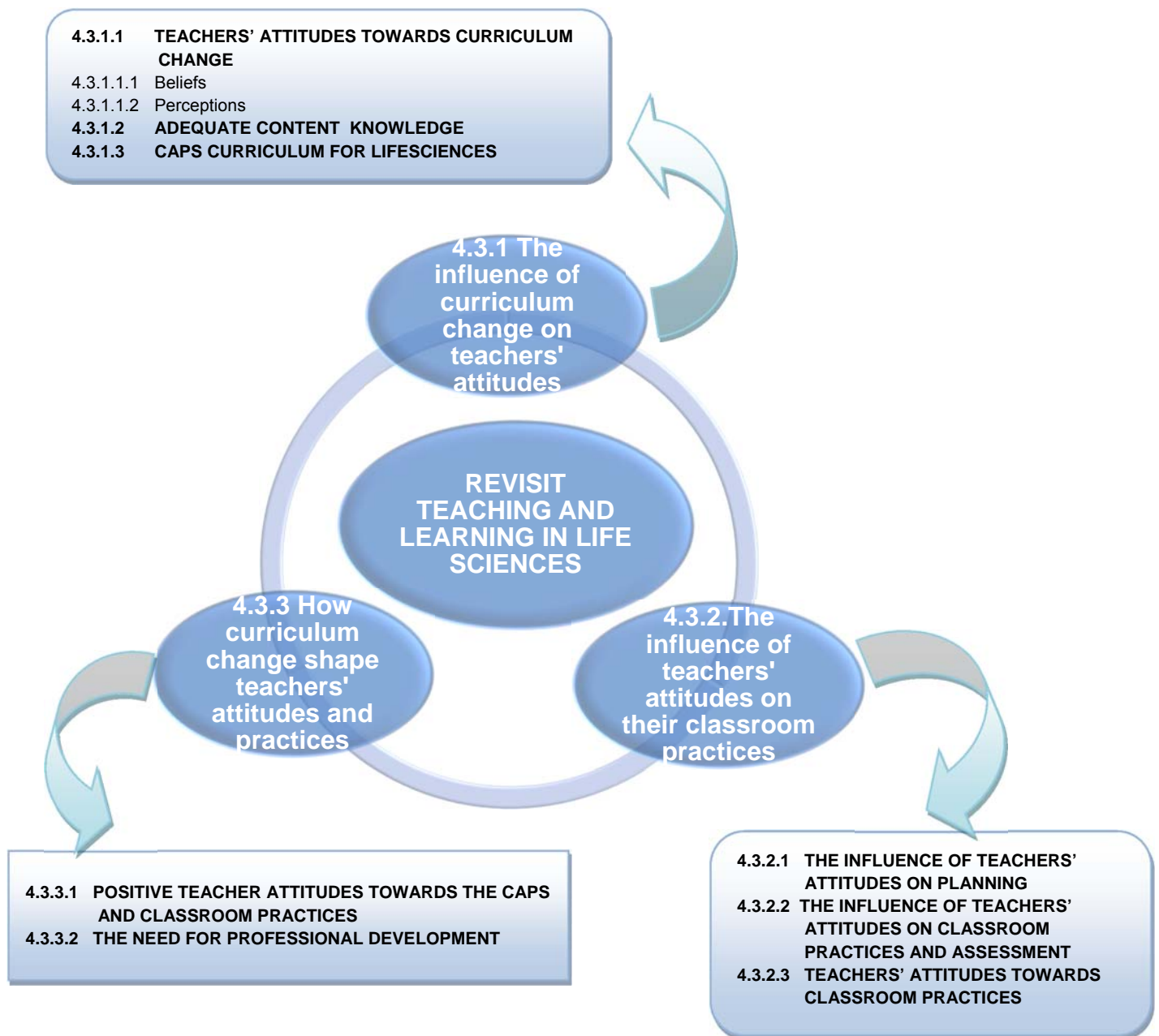
#### **4.2.2 Summary of the emerging themes**

The themes that emerged during data analysis have been summarised in the figure below. The sub-themes and categories that inform the various themes are also presented.

The figure below (Figure 4.1) shows a summary of the themes, subthemes and categories.

**Figure 4.1 Summary of the themes, subthemes and categories.**

The numbering of the themes, subthemes and categories in the figure below corresponds with the numbering of the themes, subthemes and categories in the discussion.



### 4.3 THE REPORT

The categories of themes that relate to the research objectives were identified. The various responses from the participants indicated some of the factors that inform the teachers' attitudes towards curriculum change which may influence their classroom practices. Their responses were analysed and interpreted for the purpose of reporting. The themes, sub-themes and categories as well as the various responses of the participants are discussed below. Subsequently, the interpreted results will be compared with the literature studied to establish their similarities and differences in Section 4.4.

In the next paragraphs the theme on the influence of curriculum change on teachers' attitudes will be discussed.

#### 4.3.1 THEME 1: THE INFLUENCE OF CURRICULUM CHANGE ON TEACHERS' ATTITUDES

This theme captures how curriculum change influences Life Sciences teachers' attitudes. It is organised in the following subthemes:

4.3.1.1) teachers' attitudes towards curriculum change:

4.3.1.2) adequate content knowledge and:

4.3.1.3) the CAPS curriculum for Life Sciences.

The table below (table 4.1) shows the various subthemes and categories in this theme.

**Table 4.1 Subthemes and categories in theme 1**

Theme 1	Subthemes	Categories	
4.3.1. The influence of curriculum change on teachers' attitudes	4.3.1.1. Teachers' attitudes towards curriculum change	4.3.1.1.1	Beliefs
		4.3.1.1.2	Perceptions
	4.3.1.2. Adequate content knowledge		
	4.3.1.3. The CAPS curriculum for Life Sciences		

#### **4.3.1.1. Teachers' attitudes towards curriculum change**

This subtheme (see Table 4.1), exposes the Life Sciences teachers' attitudes towards curriculum change and how it influences curriculum change implementation. This subtheme is further divided in the following categories: (i) beliefs and (ii) perceptions. These two categories will be discussed in the next paragraphs in correlation with the experiences and responses of the participants in this study and in relation to the objectives of the study.

##### **4.3.1.1.1 Beliefs**

Understanding the teachers' beliefs about curriculum change is crucial to curriculum change implementation (Van Veen and Slegers, 2006:234). As suggested by the above scholar, teacher beliefs about curriculum change do have an influence on their attitudes towards curriculum change which may influence its implementation. In her response, one of the participants, B, indicated that she is positive about the new CAPS curriculum because it has made her work as a Life Sciences teacher easier since the formal assessment tasks are set by the Department of Education officials. This is an indication of how her beliefs that the curriculum has simplified her work influenced her attitudes towards the curriculum, hence her response about being positive:

*Participant B...I am positive about it [CAPS], because it has made learning very easy. It has made our work easier, because of the formal assessment that is designed from the Department. So there is no way in which you can be left behind because you've got the pacesetter and you've got the scope of work you must do and complete it during a particular period and also report back.*

Participants B and C also expressed their excitement in looking forward in anticipation towards their lesson presentations:

*Participant B ...I feel very excited every time I go to class to teach these learners.*

The same response was echoed by Participant C.... *In all honesty, grade 12; I get very excited when I go to teach the class.*

The excitement expressed by the two participants towards lesson presentations, as indicated in their various responses, may be attributed to their positive attitudes which may have been influenced by their beliefs that the curriculum change has made their work easier. In contrast to the beliefs of participants B and C, participant A expressed her concern about the lack of adequate time and more content in grade 12:

*The fact that it is new, you need to sit and learn it ... but you don't have the time. There is also this issue of the more content, particularly in grade 12 for less time. We don't have enough time...you don't have adequate time to do remedial or homework or classwork. You sometimes just provide corrections quickly before you start another lesson.*

Participant A's belief about the lack of time may influence her attitudes towards the curriculum. It has been argued by scholars that curriculum change implementation in the classroom is directly impacted by the teachers' beliefs and attitudes about the curriculum (Roehrig, Kruse and Kern 2007:885). According to Kim, Tan and Talaue (2013:306), the teachers' beliefs may influence their attitudes and guide their instructional decisions in their classroom. Teaching beliefs and attitudes determines how the teacher handles curriculum materials in the classroom.

#### **4.3.1.1.2 Perceptions**

Some of the participants have very strong perceptions about teaching and learning which may inform their attitudes towards curriculum change. The perceptions of the teachers in this study can be summarized as; their perceptions regarding how learners learn; teachers' role in the classroom and the importance of the content topics. These perceptions may have an influence on their attitudes towards curriculum change. Participant A in this study perceived that the CAPS curriculum incorporates a lot of practical work and the time is not adequate to successfully conduct the practical classes:

*Yes it needs a lot of practical work and these practical work you need to plan for it, you don't have the time because you are sometimes teaching five or more classes that also needs extra planning.*

This perception may greatly influence her attitudes towards the curriculum change; she may be reluctant to conduct those practical classes because of the development of negative attitudes towards the curriculum because the goals of the change are not aligned to her perceptions. Her response affirms this statement:

*...sometimes if you were to do a practical, because of time you can just instead of teaching the learners' ... you just explain this practical to the learners instead of doing it.*

According to Charalambous and Philippou (2010:2), teachers' perception about their ability to successfully implement the demands of curriculum change as well as the pressure related to their daily duties also influences their attitudes towards curriculum change implementation. Participant A's response quite affirmed this scholar's argument. Her perception about her ability to teach evolution which she termed abstract is evident:

*Evolution because we are far from places such as cradle of human kind in Johannesburg, you are talking something that is abstract to the learners and you have nothing except the pictures to show them.*

Her perception may influence her attitudes towards teaching evolution, which may also influence curriculum change implementation.

Participant B also describes the influence of her perceptions on her attitudes especially with common assessment tasks from the Department of Education:

*It [my perceptions] does influence my attitudes because if I am assessing my learners whom I know their abilities, and I know that I taught these learners how to answer certain questions. If they didn't answer the questions the way I*

*taught them, I might decide to amend the memo to suit my need because of the attitude I have.*

#### **4.3.1.2. Adequate content knowledge**

This subtheme captures the Life Sciences teachers' views on the influence of adequate knowledge on the development of attitudes towards curriculum change. According to Shippen, Crites, Houchins, Ramsey, and Simon (2005:14), the lack of adequate content knowledge is one factor that may contribute towards the development of negative attitudes towards curriculum change. The teachers' capacities in terms of how much they know may also inform their attitudes towards curriculum change implementation (Charalambous and Philippou, 2010:1). Bansilal and Rosenberg (2011:118) indicated that poor content knowledge of teachers may have a negative impact on teaching the accurate curriculum content; in designing connected and coherent well-paced lessons, and in ensuring that the coverage of the concept was adequate.

As indicated in Seikkula-Leino (2011:74), adequate curriculum content knowledge is essential for the teacher in the successful implementation of curriculum change. Content knowledge, according to Hudson (2013:365), is critical to the attainment of effective classroom practices. For Life Sciences teachers, adequate content knowledge is very crucial in their classroom practices because it reinforces positive attitudes (Ibrahim, Al-Kaabi and El-Zaatari 2013:29). The teachers' lack of adequate content knowledge may contribute to their negative attitudes towards curriculum change implementation.

In confirmation of the literature studied on the importance of adequate content knowledge or lack thereof in the development of attitudes towards curriculum change implementation, the participants in this study mentioned that they are up-to-date with the necessary content knowledge in Life Sciences and they are confident with their level of knowledge. This is an indication of participants' attitudes towards the CAPS because the content has not changed a lot.

Participant B... *I am up-to-date with the necessary content knowledge, presently I am doing fine...I am confident enough...there are no challenges whatsoever.*

Participant C...*I would like to believe that I am up-to-date, especially in grade 12...I am confident and relaxed when it comes to it [adequate knowledge].*

In addition to this, participant A indicated that she is confident in most topics in the grade 12 content and indicated that she needs support in the topic of evolution.

Participant A... *Yes in most of the topics I am confident....I need support in the topic of evolution in grade 12.*

The literature emphasised the importance of the teachers' content knowledge in the effective implementation of curriculum change in the classroom (Gerrard and Farrell, 2014:638). The participants in this study however did not mention any negative influence of inadequate content knowledge in attitude development towards curriculum change and classroom practices in their responses, however they did express that their adequate knowledge (participant B and C) is the source of their confidence. In other words their adequate content knowledge informs their confidence in teaching the subject.

#### **4.3.1.3. The CAPS curriculum for Life Sciences**

The CAPS curriculum is intended to offer a quality school curriculum that better equips the learners with appropriate knowledge, skills and values to meet the challenges of knowledge-based, interdependent world (DBE, 2011:10). According to the Department of basic Education, the content framework of Life Sciences focuses on ideas, skills and concepts and the connections between them (DBE, 2011:10). The CAPS Life Sciences curriculum offers contents that relates to the learners daily lives which may help the teachers to adapt their instructions to their local circumstances and availability of materials. This may influence the development of positive attitudes towards the curriculum because the teachers are not confined to



the usage of specific instruction materials. The participants indicated that the CAPS curriculum relates to the learners' daily lives:

Participant 'A'... *"Yes it does, especially grade 11, which I taught recently; I saw they were relating to things that affect the learners' lives like diseases. When you teach the respiratory system, you teach the lungs, you also teach the diseases that affect the lungs".*

Participant B... *"I believe so, with this issue of rhino poaching, the learners are experiencing that. They see on television about rhino poachers. Most recent one is in grade 12 CAPS curriculum syllabus about contraceptive strategies whereby it was in the news about a contraceptive method which lasts for about three years; pupils can relate it to their daily lives".*

Participant C... *"I would like to believe so because the content, everything that is been done, even if I didn't mention them all, they are relevant. Basically I would like to believe they are relevant to their day-to-day lives".*

It can be deduced from the participants' responses that the CAPS curriculum relates to the learners' daily lives which might enable them to relate their learning to their everyday experiences (Park 2008:309). De Villiers (2011:537) emphasised that curriculum content that relates to the learners' everyday lives starts them on the road to learning new knowledge. In line with the literature, all the participants agree that the CAPS curriculum relates to the learners daily lives and may contribute to their learning new knowledge and developing positive attitude towards the subject.

In the next paragraph, the theme on the influence of attitudes on classroom practices will be discussed.

#### **4.3.2. THEME 2: THE INFLUENCE OF TEACHERS' ATTITUDES ON THEIR CLASSROOM PRACTICES**

This theme captures how the Life Sciences teachers' attitudes influence their classroom practices. It is organised in the following subthemes:

##### **4.3.2.1) the influence teachers' attitudes on planning**

4.3.2.2) the influence of teachers' attitudes on classroom practices and assessment and: 4.3.2.3) teachers' attitudes towards classroom practices.

The table below (table 4.2) shows the various subthemes in this theme.

**Table 4.2 The subthemes in theme 2**

Theme 2	Subthemes
4.3.2. The influence of teachers' attitudes on classroom practices	4.3.2.1. The influence of teachers' attitudes on planning.
	4.3.2.2. The influence of teachers' attitudes on classroom practices and assessment.
	4.3.2.3. Teachers' attitudes towards classroom practices.

#### **4.3.2.1 The influence of teachers' attitudes on planning**

Planning enables the teachers to organise their lessons and execute them meaningfully. The inability of the Life Sciences teachers to plan will expose their weaknesses and increase their feelings of inadequacy, insecurity and lack of confidence. Participant B, in her response, captures the importance of this; she indicated that a lack of proper planning may lead to the learners' not regarding the teachers as important in their learning. This means that if the learners no longer regard the teachers as important in their learning, it may increase the teachers' feelings of inadequacy and insecurity, which might negatively influence their attitudes. Participant C indicated that planning is important for the Life Sciences teachers because it gives them a sense of direction that enables them to know what to do in the classroom:

Participant B... *I think so [planning is important] because I do plan weekly, it is so embarrassing to go to class without proper planning, and you find some of the topics or some of the terms for the first time together with your learners and when they start asking you questions, you will feel embarrassed... [Because] some of the learners read ahead of you and they may no longer regard you as important in their learning.*

Participant C... *Without planning it would be havoc, you would not represent yourself in a professional manner. So if you plan, when you get to class you know exactly what to do, how to do it, [and] the possible problems you may encounter... planning is key.*

According to Blackman, Conrad and Brown (2012:161), planning is one of the factors that contribute to attitude development and change among teachers and the attitudes the teachers hold towards the curriculum do affect their planning. The participants in this study indicated that their attitudes towards the CAPS curriculum do affect their planning. Participant A describes how inadequate time and lots of work influences her negative attitudes towards planning in grade 12:

*It [my attitude] affects my planning because I have to plan a lot of work in a very short time. It [my attitude] is negative because I have to plan for the normal class hours that I teach, and I also have to plan for after school teaching, I also have to plan for extra class Saturdays, holidays etc. You don't have time to even recharge.*

Participant B also agrees that her attitudes affect her planning, especially if she is not interested in a particular topic:

*It [my attitude] does affect my planning because if I am not interested in a particular topic, I can delay and then you find that I don't bring that "life" in the presentation.*

In conclusion, one could conclude that the teachers' attitudes do influence their planning.

#### **4.3.2.2 The influence of teachers' attitudes on classroom practices and assessment**

It has been argued that classroom practices are directly impacted by an individual teacher's attitudes about teaching, learning and assessment (Roehrig, Kruse and Kern 2007:885). Assessment is the process of collecting, analysing and interpreting

information to assist teachers in making decisions for the progress of learners (DBE, 2011:4). According to Singh (2012:595) assessment is a very important factor in the classroom practices of the Life Sciences teachers. The participants in this study generally agree that being up-to-date with assessment signify positive attitudes towards curriculum change and classroom practices. The fact that participant A expressed her frustrations over not being able to plan her assessment properly, and always being in a hurry is an indication that she has a positive attitude towards her classroom practices and that she also recognises the importance of assessment as a part of classroom practice:

*...It does because you don't have enough time to plan your assessment that leads the learners to pass the examinations because you are always in a hurry, you can miss some of the things that you need to have assessed because you are always in a hurry.*

Participant A also expressed her dissatisfaction with the informal assessment requirements which are not clearly stipulated in the curriculum:

*I think the formal assessment is ok because they require one practical and one formal test per term, but they didn't really prescribe how much informal homework or the topic and so on. I think it is inadequate in the informal assessment.*

Kanjee and Sayed, (2013:444) said that teachers need quality assessment information from the assessment policy in order to make appropriate decisions in their classroom practices. This relates to what Wood and Butt (2014:5) indicated: that teachers' adherence to the assessment policy is very important in their classroom practices. Participant C in contrast to A and B in this study feels that the curriculum policy provides a guide that must be followed because he doesn't deviate from the assessment policy stipulations in his classroom practices:

*... The policy on assessment for me I would say it is good, without the policy, I wouldn't have guidance hence I make it a point that I follow the policy, that is*

*my main thing. I do not deviate at all from the policy. I make it a point that each and everything that is in it is tackled.*

Charalambous, Philippou and Kyriakides (2008:126) said that the teachers' beliefs about assessment may inform their attitudes towards the assessment policy prescribed by the curriculum. One of the participants, C, in agreement with the above scholars indicated that his belief in the various techniques and strategies employed in the assessment policy inform his positive attitudes towards the assessment policy:

*The various ways to approach it...I would like to believe your techniques and strategies...such things inform my positive attitudes, [and it] affects the class positively as well.*

#### **4.3.2.3. Teachers' attitudes towards classroom practices**

This subtheme captures how the Life Sciences teachers' attitudes towards curriculum change influence their classroom practices. Blackman, Conrad and Brown (2012:161) said that attitudes provide a simple structure for organising and responding to a complex environment. Evidence from research suggests that teachers' attitudes can and do influence their classroom practice (Wilkins, 2010:27). In the context of teaching and learning, the teachers' attitudes towards the subject of Life Sciences may have a strong influence on the way in which the subject is taught (Wilkins, 2010:25). This suggests that the overall attitudes of the Life Sciences teachers towards curriculum change may positively or negatively influence their classroom practices. Participants' B and C's responses affirm Wilkins's arguments that the teachers' attitudes towards the subject may have an influence on their classroom practices:

*Participant B... I think so [teachers' attitudes influence their classroom practices], because if you are a teacher and then you have this positive attitude towards your learning area, it attracts the learners, even if you are not coming to work, even if you are absent, the learners will fill that void.*

Participant C... *Indeed it [teacher's attitude] does influence classroom practices, if you are happy, if you love your subject you rub that off to the learners, they will also love the subject, view it positively and give it attention.*

According to Blackman, Conrad and Brown (2012:160), attitudes are affected and shaped by the quality of preparation and experiences of the teacher. This statement reflects the response of participant A whose attitudes are shaped by the quality of her preparations in her classroom practices. This can be inferred from her response that due to a lack of time she does not conduct her practical classes properly (see paragraph 4.3.1.1.2).

Participant A... *Yes it [my preparations] does [shape my attitudes], because sometimes if I were to do a practical, because of lack of time, I can just instead of teaching the learners the practical like they should observe and touch or analyse, it takes time...I opt for short cuts where I just explain this practical to the learners.*

In line with the literature therefore, the attitudes of the participants in this qualitative investigation illustrate that teachers' attitudes toward curriculum change do influence their classroom practices.

In the next paragraph, the theme on how curriculum change shapes the teachers' attitudes and practices will be discussed.

#### **4.3.3. THEME 3: HOW CURRICULUM CHANGE SHAPE TEACHERS' ATTITUDES AND PRACTICES**

This theme captures how the effects of curriculum change on teachers' attitudes and practices can be understood. It is organised in the following subthemes:

4.3.3.1) positive teacher attitudes towards the CAPS curriculum and classroom practices:

4.3.3.2) the need for professional development.

The table below shows the subthemes in this theme.

**Table 4.3 Subthemes in theme 3**

Theme	Subthemes
4.3.3. How curriculum change shape teachers' attitudes and practices	4.3.3.1 Positive teacher attitudes towards the CAPS curriculum and classroom practices.
	4.3.3.2 The need for professional development.

#### **4.3.3.1 Positive teacher attitudes towards the CAPS curriculum and classroom practices**

This subtheme as indicated in Table 4.3 focuses on the influence of positive attitudes towards the curriculum in promoting effective classroom practices of the Life Sciences teachers. Gibson, Ivancevich, Donnelly, and Konopaske (2006:105) suggest those teachers' attitudes towards their classroom practices can either be positive or negative, depending on their beliefs and emotions towards curriculum change. Teachers who are optimistic about curriculum change or those whose beliefs are in line with the reform are more likely to be open to new ideas and are more willing to adopt the reform (Charalambous, Philippou and Kyriakides 2008:127) than those whose beliefs are not aligned to the curriculum change.

Kim (2009:357) argues that positive teacher attitudes towards curriculum change are believed to have a positive influence on their classroom practices and, in turn, the learners' learning. It can indeed be deduced from the response of participant B that her positive attitudes towards the CAPS curriculum may have informed her confidence in teaching the subject and may have also influenced her classroom practices positively. She also mentioned that her attitudes towards the CAPS curriculum has made learning very easy which is quite in line with the arguments of Kim (2009:357) that positive attitudes towards curriculum change influence the learners learning:

*I am confident in teaching Life Sciences and... I am positive about the CAPS curriculum... it has made learning very easy.*

Participants B further indicated that her positive attitudes towards the CAPS curriculum is influenced by some factors in the curriculum such as the simplified curriculum language, simplified and user-friendly curriculum materials, and the absence of what she termed 'bombastic' words:

*...For example in grade 12 CAPS, you find that the textbook that I use are in a simple manner, and they are also user friendly. The subject matter also is simplified so that the learners will be able to study all by themselves and there are no longer bombastic words.*

Form the response of participant B, it seems that simplified curriculum language makes it easier for the teachers to understand what they should do in their classroom practices, since this helps to eliminate the frustration associated with confusing curriculum language and difficulty to understand curriculum materials which might inform the development of negative attitudes.

The literature reviewed indicate that the teachers' personal characteristics, such as their belief systems and perceptions towards curriculum change, if they are positive, may lead to the development of positive attitudes and influence towards their classroom practices. Positive teacher attitudes towards curriculum change may also be informed by factors in the curriculum change which positively influence the teachers' attitudes towards their classroom practices, such as simplified curriculum materials, unambiguous curriculum language and user-friendly curriculum materials.

#### **4.3.3.2 The need for professional development**

Professional development improves the classroom practices of teachers because through learning, teachers acquire new knowledge and skills (Spillane, Healey and Parise, 2009:407) necessary for the successful implementation of curriculum change. Gibson and Brooks (2012:1), in agreement with above scholars argue that professional development allows the teachers to increase their knowledge and



develop new instructional strategies needed to effectively implement curriculum changes and improve classroom practices. During the semi-structured interviews, participants A and C indicated that they need support in the topics of evolution, photosynthesis and gaseous exchange respectively. Although they did not specifically mention professional development, it can be deduced from their responses that they acknowledge that in order to successfully implement curriculum change, they need to acquire new knowledge on the topics of evolution, photosynthesis and gaseous exchange through professional development. This corroborates the argument of the above scholars that professional development provides the teachers with the necessary knowledge and skills needed to improve their classroom practices and successfully implement curriculum change:

*Participant A ...Like I said, except for those topics that are newly introduced and maybe I haven't done them at the University... I need support in the topic of evolution.*

*Participant C...I need support in grade 11 content, e.g. photosynthesis, gaseous exchange, etc. such topics I am really not confident. I can teach them, I do present them, I do prepare and try to present them very well and apply the techniques and strategies which assist learners, however, myself personally I am not at ease with them...*

According to Park and Sung (2013:26) inadequate professional development denies the teachers the necessary tools to effectively implement the curriculum change. The role of adequate professional development in the successful implementation of curriculum changes cannot be over emphasised. Gerrard and Farrell (2014:638), in a study conducted in Australia indicated that the teachers' inadequate professional development and classroom practices are most often blamed for the failures in curriculum change implementation. They emphasised the importance of professional development in the effective implementation of curriculum change and improvement in the teachers' classroom practices. This is relevant in South Africa owing to the recent introduction of the CAPS curriculum. Participants A and C above illustrates the importance of professional development from their responses. Without the

support they needed in the various content areas, which will be provided through professional development, effective curriculum change implementation will be difficult.

In the next paragraphs, the comparisons and interpretations of the research findings will be discussed.

#### **4.4 COMPARISON AND INTERPRETATION OF THE RESEARCH FINDINGS**

In this section, the findings from the literature study in chapter 2 and the qualitative investigation will be compared and interpreted. The comparison and interpretation will be summarised according to the findings on the various subthemes and categories that constitute the themes of the study.

##### **4.4.1 Teachers' attitudes towards curriculum change**

Attitudes can be described as learned, evaluative responses associated with personal beliefs that in turn influence intentions and behaviours of Life Sciences teachers. It involves a complex interweaving of beliefs, perceptions and affective responses that influence individual teachers' worldviews, their decisions and judgements (cf. 2.5.1). Roehrig, Kruse and Kern (2007) argue that the implementation of curriculum change is strongly influenced by teachers' beliefs about teaching and learning. Charalambous and Philippou (2010) go even further and argue that reform initiatives might fail if teachers' beliefs are ignored.

If one considers the fact that tried and tested approaches take teachers into comfort zones, it becomes apparent why, if we wanted teachers to move beyond their safe zone it would require considerable time and effort. Ignoring the beliefs and perceptions of the teachers might result in their exhibition of low morale as was indicated in a study conducted in the UAE by Troudi and Alwan (2010) who found that the low morale exhibited by the teachers during curriculum change is connected to their perception of their role in curriculum change as marginal, inferior and passive. This perceptions, as was argued by Blackman, Conrad and Brown (2012), leads to the teachers seeing themselves as underprepared for curriculum change

implementation and hence in need of further training in order to implement curriculum change.

Ibrahim, Al-Kaabi and El-Zaatari (2013), in their study of teachers' attitudes towards curriculum change, stated that the perceptions about the unknown consequences of change made teachers to be afraid of curriculum change. Park and Sung (2013), in a study conducted in Korea, also found that these negative and unconstructive perceptions about curriculum change may negatively impact the teachers' involvement and commitment towards the implementation of the change because the teachers' perceptions about curriculum change will have either a positive or negative influence in its implementation (cf. 2.5.3.1: 4.3.1.1.1 and 4.3.1.1.2). Ryder (2015) further agrees that individual teachers' beliefs and perceptions associated with curriculum change may influence their attitudes towards curriculum change implementation.

Deducing from the literature studied and the results of this qualitative investigation, the teachers' beliefs and perceptions about curriculum change have informed their attitudes towards curriculum change implementation. The teachers' attitudes towards curriculum change have also influenced the effective implementation of curriculum change in their classroom (cf. 2.5.3: 2.5.3.1: 2.5.4.1: 2.5.4.2: 4.3.1.1.1 and 4.3.1.1.2). In line with the literature studied, and the responses of the participants in this study, Life Sciences teachers in the Motheo district need to understand that they have to develop positive attitudes towards curriculum change in order to enhance their confidence and effectively implement curriculum change. They should also understand that they have moral obligations towards their learners and therefore showing positive commitment towards curriculum change will give them the confidence to implement it accordingly.

#### **4.4.2 Adequate content knowledge in Life Sciences**

Adequate content knowledge facilitates the attainment of effective classroom practices; it reinforces positive attitudes, and provides the basic tool for successful curriculum change implementation. The Life Sciences teachers' knowledge of the curriculum content is a factor that informs their attitudes towards curriculum change.

Life Sciences teachers' lack of adequate content may contribute to feelings of insecurity, which might lead to the development of negative attitudes and may contribute to the teachers' resistance to curriculum change implementation (cf. 2.2: 2.5.4.1 and 2.5.4.2).

Ng (2009) argues that failure in the implementation of curriculum change may be the result of insufficient content knowledge of the teachers. This can be attributed to skills and knowledge constraints, resources and workload constraints, as well as psychological constraints due to being unprepared for the change. Seikkula-Leino (2011) reiterated that curriculum change could be more successful if the teachers' content knowledge was taken into consideration. These views are in line with the responses of the participants in this qualitative study (cf. 4.3.1.2) and also the arguments of März and Kelchtermans (2013) that the teachers' knowledge and pedagogical content knowledge is very important in the implementation of curriculum change, and consequently for the quality of their classroom practices. Park and Sung (2013), although in agreement with the view of the above scholar that inadequate knowledge of the teachers impedes curriculum change implementation, also mentioned the influence of such factors as lack of opportunities to work through implementation problems and other contextual and cultural constraints that may inhibit the implementation of curriculum change.

The participants in this study highlighted the importance of adequate content knowledge in contributing to the confidence of the Life Sciences teachers in their classroom practices (cf.4.3.1.2). This supports the views from the literature studied that adequate content knowledge informs the development of positive attitudes (cf. 2.2: 2.5.4.1 and 2.5.4.2) and therefore cannot be underestimated in curriculum change implementation since learning as the core business of education relies on the teachers' positive attitudes to influence the level of learner attainment. Life Sciences teachers therefore need to acquire adequate content knowledge in the subject in order to enhance their confidence and develop positive attitudes needed to effectively implement the curriculum change.

#### **4.4.3 The CAPS curriculum for Life Sciences**

The curriculum is an important document through which a country expresses its educational requirements and therefore should be constantly updated in order to stay relevant in an ever changing world (cf. 2.1). In view of this, the content of the curriculum must address the academic needs of the learners and also be structured in such a way that it is easier for the teachers to understand and implement. According to the literature reviewed, the curriculum should provide the learners with useful knowledge and skills needed in their daily lives (cf. 2.1: 2.2 and 2.4.3.1). This is indicative of the participants' responses that the CAPS curriculum content for Life Sciences relates to the learners' everyday lives and may deepen their understanding and enhance their learning since it exposes the learners to real world situations which may be relevant in their circumstances leading to improvement in their learning (cf.4.3.1.3.).

Tong (2010) argues that curriculum change should cater for the educational needs of the learners. Catering for the educational needs of the learners, Gerrard and Farrell (2014) argue, has prompted many nations to implement curriculum change in order to enhance the learning experiences of the learners since each curriculum change requires new policy and new professional practices related to managing learners' performance. In the case of the recent curriculum change in South Africa, the CAPS curriculum for Life Sciences incorporates topics that the learners can relate to (cf.4.3.1.3), as was discussed earlier in the section, which may positively enhance their learning.

The participants also mentioned some of the various contents in the CAPS curriculum that the learners can relate to in their daily lives, such as the lungs and respiratory system as well as the diseases that affect it, the use of contraceptives and rhino poaching. Although the literature did not expose such details, it indicated that curriculum content that relates to the learners everyday lives will contribute to improving their learning. It is therefore important for the Life Sciences teachers to embrace the CAPS curriculum and strive to implement it accordingly, because it will benefit the learners.

#### **4.4.4 Influence of teachers' attitudes on planning**

Planning is one of the factors that contribute to attitude development and change among teachers. It is a process whereby the Life Sciences teachers look ahead and organise their lessons and executes them meaningfully. It gives the necessary directions to the teachers by providing them the option of using available resources to enhance their learners' learning. It also allows the teachers to make responsible instructional decisions (cf. 2.5.1 and 2.6) and is important in giving a sense of direction that enables the teachers to know what to do in the classroom (cf.4.3.2.1). The inability of the teachers to plan will expose their weaknesses and increase their feelings of inadequacy; insecurity and lack of confidence which may negatively influence their attitudes.

In line with the above discussions, Hudson (2013) argues that planning is important in the development of positive attitudes towards the effective implementation of curriculum change and enhances the classroom practices of the teachers. He also stressed that lesson planning should involve reflecting on the learning needs of the learners. The influence of planning on the teachers' attitudes therefore is very significant in view of Hudson's arguments. This quite agrees with the literature that the inability to plan will expose the weaknesses of the Life Sciences teachers and increase their feelings of inadequacy and insecurity which will negatively influence their attitudes, and also the responses in this study (cf.4.3.2.1) that the inability to plan may contribute to the learners' not regarding the teachers as important in their learning which may also increase the teachers' feeling of insecurity and inadequacy leading to the development of negative attitudes.

The above arguments, however, suggest that the effective implementation of curriculum change also depends on the ability of the Life Sciences teachers to plan, because planning will give them a sense of direction and increase their feelings of security and adequacy which may help in the development of positive attitudes towards curriculum change.

#### **4.4.5 The influence of teachers' attitudes on classroom practices and assessment**

Assessment provides an indication of learner achievement by ensuring that adequate evidence of achievement is collected using various forms of assessment. In the literature studied, mention is made that adhering to the curriculum policy on assessment will help to improve the confidence of the teachers in their classroom practices (cf. 2.4.3: 2.5.4.2 and 2.5.4.3). The Department of Basic Education (2011) further justifies the significance of adhering to the assessment policy adding that it clearly spelt out what should be taught and learnt on a term-by-term basis. In addition, it clearly stipulates the curriculum and assessment policy for all subjects from grade R–12, and the programme and promotion requirements for all the subjects from grade R to 12. The clear stipulations of the assessment policy should inform teachers' positive attitudes towards their classroom practices. In line with the importance of assessment in informing the teachers' attitudes, Kim, Tan and Talaue (2013) further argue that teachers' ideas and beliefs about assessment policy influence their decision-making in their classroom practices consciously and unconsciously.

The Department of Basic Education (2011) indicated that The National Protocol for Assessment Grades R–12 standardises the recording and reporting processes and therefore should be able to provide the teachers with all the necessary information needed to inform positive attitudes towards assessment in their classroom practices. The positive teacher attitudes towards assessment also provides an indication of learners' achievement in the most effective and efficient manner. The participants in this study agree that being up-to-date with assessment and adhering to the curriculum policy on assessment promotes the teachers' positive attitudes towards assessment (cf. 4.3.2.2) and also promotes positive teacher attitudes towards classroom practices because the assessment policy provides high quality information needed to make appropriate decisions regarding assessment in their classroom practices, which is in line with the stipulations of the literature studied (cf. 2.4.3: 2.5.4.2 and 2.5.4.3).

The CAPS assessment policy represents a policy statement for teaching and learning in South African schools, and is therefore very important for the Life Science teachers to adhere strictly to its stipulations. Life Science teachers should therefore take assessment seriously in their classroom practices because it will promote positive teacher attitudes towards their classroom practices.

#### **4.4.6 Teachers' attitudes towards classroom practices.**

From the literature reviewed (cf. 2.5.3: 2.5.3.1: 2.5.4: 2.5.4.1 and 2.6) it was deduced that teachers' attitudes have an influence on their classroom practices. Successful implementation of curriculum change or reform largely depends on the teachers' personal significant attachment to the new situation. Their knowledge, experiences, beliefs and attitudes are very important (cf. 2.5.3.1). In line with the literature, the participants in this study concurred that positive teachers' attitudes creates positive learning environment (cf. 4.3.2.3) and will have positive influence on their classroom practices and curriculum change implementation (cf. 2.5.3: 2.5.3.1: 2.6 and 4.3.2.3).

In line with the above views, Roehrig, Kruse and Kern (2007) argue that beliefs and attitudes about teaching have a significant impact on classroom practices and curriculum change implementation stating that beliefs are clearly the driving factor shaping the attitudes of the teachers in the classroom. This view is supported by Kim, Tan and Talaue (2013) who argue that teachers' beliefs influence their attitudes towards classroom practices. Hussain, Ali, Khan, Ramzan and Qadeer (2011) also agree that teachers' attitudes towards teaching and learning are very important in their classroom practices. There is evidence from the literature to support that the attitudes of the Life Sciences teachers are of vital importance in their classroom practices. Positive teacher attitudes will lead to positive outcomes in their classroom practices while negative attitudes will equally lead to negative outcomes in their classroom practices. This view is supported by the responses from the participants in this study that if a teacher exhibits positive attitudes, it rubs off to the learners and they will love the subject, view it positively and give it attention even when the teacher is absent from class (cf.4.3.2.3). Life Sciences teachers therefore need to acknowledge the importance of their attitudes in influencing their classroom



practices. Having positive attitudes will ultimately influence their classroom practices positively.

#### **4.4.7 Positive teacher attitudes towards the CAPS curriculum and classroom practices**

It emerged from the study (cf. 4.3.3.1) that simplified curriculum language and user friendly curriculum materials are some of the major factors that contributed to the teachers' positive attitudes towards the CAPS curriculum and their classroom practices. In the literature reviewed, in contrast to the participants views, mention was made of the influence of such factors as the teachers' lack of professional development, non-inclusion in the curriculum development process, their beliefs and perceptions about the curriculum, and also psychological factors in informing their attitudes towards curriculum change and classroom practices (cf. 2.5.4.1: 2.5.4.2: 2.5.4.3: 2.5.4.4 and 2.6).

Ryder and Banner (2013) argues that teachers' attitudes towards a curriculum may be associated with their belief that the curriculum may not be able to help their learners. In line with the above scholar's views, one of the participants attributed her positive attitudes towards the CAPS curriculum to the fact that it has made learning easier for the learners (cf. 4.3.3.1).

Gerrard and Farrell (2014) argue that curriculum change introduces new policies and practices, which marks an important intervention into the teachers' work and may lead to new conceptualizations and practices which may inform attitude development. In agreement with the above scholars' views, the participants in this study contend that the CAPS curriculum introduces more practical work in Life Sciences. Moreover, the curriculum language is easy to understand and the curriculum materials are user friendly. The assessment policy is also clear on assessment guidelines. This informs their positive attitudes towards it.

Charalambous and Philippou (2010) argue that teacher beliefs are one of the factors influencing their attitudes towards classroom practices. Kruger, Won and Treagust (2013) in agreement contend that the teachers' beliefs about the curriculum influence

the manner in which they interpret and implement the curriculum in the classroom. In contrast to the views of the previous scholars and in line with factors that inform teachers' attitudes towards classroom practices, Gibson and Brooks (2013) argue that lack of professional development is a major factor that informs teacher attitudes towards classroom practices.

Developing positive attitudes towards curriculum change ensures positive influence on classroom practices. The participants contend that they have positive attitudes towards the CAPS because it has made learning easy because the subject matter is simplified, user friendly and devoid of bombastic words (cf.4.3.3.1). Today's dynamic and changing educational landscape demands a curriculum that addresses the learners skills and knowledge needs for their holistic development as well as focused Life Sciences teachers who are capable of interpreting and applying the curriculum objectives successfully.

The importance of the Life Sciences teachers' positive attitudes towards the CAPS curriculum has been emphasised in this study (cf. 4.3.3.1). The importance of developing positive attitudes towards the curriculum change as profiled by both the literature and this study suggest that the Life Sciences teachers should make considerable efforts towards being optimistic about curriculum change, changing their beliefs and perceptions about curriculum change, acquiring adequate knowledge needed to implement curriculum change and understanding that the curriculum should be constantly upgraded in order to ensure adequate and up-to-date knowledge. In this way curriculum change implementation will no longer be a nightmare to the Life Sciences teachers, rather it will be seen as an important process in Life Sciences education.

#### **4.4.8 The need for professional development**

Curriculum change usually introduces new conceptualisations and practices which the Life Sciences teachers may not be too familiar with, hence the need for the upgrade in their knowledge and skills through professional development. In this study, the need for the Life Sciences teachers' professional development in ensuring the acquisition of the necessary knowledge and skills needed for the successful

implementation of curriculum change is highlighted in the literature. According to the literature, professional development is the intentional ongoing and systematic process designed to enhance the professional knowledge, skills and attitudes of teachers for the successful implementation of curriculum change and enhanced classroom practices (cf. 2.2: 2.3 and 2.5.4.1).

Desimone (2009) argues that professional development provides the teachers a vast range of activities and interactions that may increase their knowledge and skills and improve their classroom practices, as well as contribute to their personal, social, and emotional growth as teachers. This informs Ng's (2009) argument that strengthening professional development is one of the strategies recommended to improve the implementation of the curriculum change. Improvements in the implementation of curriculum change, argues Spillane, Healy and Parise (2009) should involve professional development for all stake holders most especially, the teachers and should not be limited to the principals alone because the teachers are at the forefront of curriculum change implementation. Gibson and Brooks (2012) further argue that effective professional development should be based on the teachers' needs and should involve active learning because change in classroom practices and effective implementation of curriculum change is less likely to occur if teachers do not feel supported and inspired.

In line with the literature reviewed which highlighted the importance of professional development to initiate changes in the teachers' attitudes, and enhance the teachers' knowledge and skills relevant for the successful implementation of curriculum change (cf.2.5.4.1) and also the views of the participants who indicated that the acquisition of relevant knowledge in evolution, gaseous exchange, and photosynthesis will enhance their classroom practices (cf.4.3.3.2). It is clear that professional development will increase the confidence of the Life Sciences teachers and stimulate positive attitude development towards curriculum change and also improve their classroom practices. In contrast to the literature reviewed, the participants did not specifically mention professional development, but nevertheless, the role of professional development in shaping the teachers attitudes and practices

cannot be underestimated, and therefore should be initiated to ensure that the teachers are adequately prepared for curriculum change implementation.

#### **4.5 SUMMARY**

The results of this study show that there are connections between the teachers' attitudes to curriculum changes and their classroom practices. The attitudes of the Life Sciences teachers towards curriculum changes have an influence in its successful implementation. Teacher attitudes towards curriculum change are informed by their beliefs and perceptions about the reform, their concern about the impact of the change on their learners and the fear of the unknown. Positive teachers' attitudes towards curriculum change enhance their confidence in their classroom practices and can be developed through the acquisition of the necessary content knowledge and skills as well as change in beliefs and perceptions. It was evident from the results of this study and the literature that adequate content knowledge in Life Sciences reinforces confidence and positive attitudes in the teachers which is critical to the attainment of effective classroom practices.

The CAPS curriculum content which clearly stipulates how the content should be taught and assessed in a clear and unambiguous language creates positive attitudes towards the effective implementation of curriculum change. The teachers' planning and assessment, which is an integral aspect of their classroom practices, is enhanced by a clear and straightforward assessment policy in the CAPS curriculum. Planning and assessment guides the teachers in their classroom practices. Moreover, adequate planning eliminates the Life Sciences teachers' feelings of weaknesses and insecurity and increases their feelings of adequacy, security and confidence. These positive feelings may also inform positive attitudes towards the curriculum and may have positive influence on their classroom practices. The teachers' ability to adhere strictly to the assessment policy will also enhance their classroom practices. The strict adherence of the Life Sciences teachers to the stipulated policy on assessment by the CAPS curriculum will provide the necessary support needed to enhance their classroom practices and will promote positive attitudes development towards the implementation of the curriculum change.

Clearly, it has become necessary for the Life Sciences teachers to have up-to-date content knowledge in Life Sciences for the successful implementation of curriculum change. Professional development is the strategy through which the teachers will acquire all the necessary content knowledge and skills needed to successfully implement curriculum change. Through learning, they will acquire new knowledge and skills which will boost their confidence leading to their development of positive attitudes towards curriculum change.

Attitudes do have an influence on the overall teaching practices of the Life Sciences teachers. Positive teacher attitudes informed by adequate content knowledge in the subject and simplified curriculum materials will positively influence the classroom practices of the Life Sciences teachers.

The researcher so far has developed an account of how curriculum changes shape teachers' attitudes and classroom practices. In the next chapter, the overview of the development of the study will be reviewed and the findings of the study together with the achieved objectives will be synthesised into guidelines that will equip the Life Sciences teachers with the necessary knowledge to deal with curriculum change and enhance their classroom practices. It further reports on the limitations of the study and makes recommendations for further studies.

# CHAPTER 5

## FINDINGS, CONCLUSIONS AND GUIDELINES

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### 5.1 INTRODUCTION

In the previous chapter, the qualitative data obtained from the Life Sciences teachers during the semi-structured interviews were analysed, interpreted and compared with the literature reviewed. An attempt was made to understand and interpret the effects of curriculum change on the Life Science teachers' attitudes and its influence on their classroom practices.

In this chapter, the findings in Chapter 4, the literature studied as well as the conclusions made by the researcher, enabled the researcher to lay down guidelines and make recommendations. These guidelines will help the Life Sciences teachers, decision makers and managers to better understand curriculum change and successfully implement it in their classroom practices as well as management and training. The limitations which were discovered in this study are explained and recommendations for further study are considered. The discussions in this chapter are aligned with objective 4 of the study.

### 5.2 OVERVIEW OF THE DEVELOPMENT OF THE STUDY

This study was about establishing the effect of curriculum change on the attitudes of the Life Sciences teachers and how their attitudes influence their classroom practices. In Chapter 1, the background that informed the study was explored and the research problems and research questions were established. This revealed that the implementation of curriculum change in the classroom might result in the waste of resources, time and effort because the intentions behind the changes might not be translated into classroom reality. The other revelation was that the teachers' varying and sometimes resistant personal beliefs might inform their negative attitudes towards curriculum change and might play significant roles in the failure of the implementation of curriculum change. The teachers' attitudes towards curriculum change often act as a guide in the journey towards its effective implementation in the

classroom, and also determine the successes and/or failures of its implementation. This together with the recent introduction of the CAPS curriculum prompted the following questions: How have the changes to the Life Sciences curriculum affected the teachers' attitudes? How have the attitudes of the teachers to the changes in the Life Sciences curriculum affected their classroom practices, if at all? How can the effect of curriculum changes on teachers' attitude, if any, be understood? What suggestions and/or recommendations can be made to address the effects of curriculum change on teachers' attitudes, if any? In an attempt to answer these questions, the general aim of the study was indicated as to understand how the new Life Science curriculum (CAPS) affected the teachers' attitudes, and their classroom practices. Consequently, the research objectives were considered.

The research methodology was briefly explained in Chapter 1, and the details of the qualitative methodology employed in this study were given in chapter 3. The qualitative research methodology gave an insight into the effects of curriculum change on the Life Sciences teachers' attitudes as well as its influences on their classroom practices. The researcher conducted semi-structured interviews with the participants, who were selected in a purposive manner, in order to obtain comprehensive data on the research topic. This data was recorded and subsequently analysed and the trustworthiness of the study was established.

In Chapter 2, the literature on curriculum change, implementation and teacher attitudes were reviewed. A definition of attitudes was developed and the influence of curriculum change on teachers' attitudes and classroom practices was discussed. A further discussion of some of the factors that may inform teachers' attitudes towards curriculum change was made. A detailed overview of the South African curriculum from the inception of democracy in 1994 was made to highlight the successive curriculum changes that have been undertaken in the journey towards an effective and comparable education system. The connection between curriculum change and the teachers' classroom practices were also emphasised. Evidence from the literature suggested that the quality and preparations of the Life Sciences teachers in terms of their adequate knowledge, experiences, beliefs and significant attachment to the curriculum change might promote positive attitudes towards their classroom practices. The factors that may inform the teachers' negative attitudes towards

curriculum change and impact their classroom practices were also elaborated, it include: lack of adequate knowledge, lack of professional development, negative attitudes towards the curriculum, concern about the curriculum's influence on the learners' learning, as well as psychological factors. The theoretical framework for the study was elaborated upon and extensively discussed.

In chapter 3, the development of a qualitative study using semi-structured interviews as data collection tools to explore the effect of curriculum changes on the Life Sciences teachers' attitudes and how their attitudes influence their classroom practices was described. The rationale for the choice of semi-structured interviews, and the various research objectives addressed by each interview question were indicated. The advantages and disadvantages of using semi-structured interviews were also indicated. This investigation was useful because it gave a detailed view of the participants and presented a clearer understanding of the phenomena investigated. In chapter 4, the data obtained was analysed qualitatively according to the key themes of analysis, interpreted and compared with the literature.

This qualitative study has led to the achievement of the research objectives. Objectives 1. 2 and 3 are met in chapter 4 of the study while objective 4 will be addressed in the paragraphs below.

### **5.3 GUIDELINES.**

In confirmation of the findings derived from the themes, subthemes and categories that emerged during the analysis of data, the review of literature and the conclusions presented in this study, related guidelines were compiled which by no means are exhaustive. The aim is to formulate guidelines that may help the Life Sciences teachers to develop positive attitudes towards curriculum change which may lead to improved classroom practices and promotes successful curriculum change implementation.

The guidelines derived from the themes, subthemes and categories of this study as well as the literature reviewed indicated that, firstly, the professional development of the teacher is very important for the acquisition of new knowledge, skills and new instructional strategies. It also contributes to the personal, social and emotional



growth of the teachers. It is therefore important that measures should be taken to ensure that the teachers and all stake holders are adequately prepared for curriculum change implementation through professional development programmes. According to the responses from the Life Sciences teachers in this study, mention was made that lack of requisite content knowledge needed to adequately teach the topic of evolution in grade 12 influences the teachers' negative attitudes towards the CAPS and curriculum change. The CAPS curriculum content on evolution incorporates such topics as punctuated equilibrium, evolution in present times, natural and artificial selection, variation within species, formation of new species, reproductive isolation, evolution in present times, human evolution, major phases in the hominid evolution, out of Africa hypothesis and evidence of common ancestors for living hominids.

These topics often prove very difficult for most teachers because it includes a vast array of subtopics which requires adequate content knowledge in evolution, which the teachers may be lacking. Moreover one of the participants in the study mentioned the lack of adequate time to cover all the aspects of the topics within the specified year plan in the CAPS grade 12. It is therefore recommended that professional development programmes aimed at equipping the teachers with the relevant content knowledge in evolution and the other topics as demanded by the CAPS should involve active learning of the content through an in depth training / workshops on the various aspects. The training / workshops should also be conducted in phases with each phase focusing on one aspect of the topics. It should be spaced out over a period of time to ensure better memory and understanding for the teachers and all stake holders, instead of short, massed, one day workshops. This will help to stimulate positive attitude development towards the topic as well as curriculum change and enhancing classroom practices because adequate content knowledge promotes self-confidence and positive attitudes.

The trainings / workshops should also be conducted during the school holidays to minimize the disruption of tuition time in classes. Experts in the field of evolution and the other topics should be invited from institutions of higher learning to present the lectures during the trainings. The teachers should be made to work individually and in groups during the sessions on the various aspects of evolution and the other

topics to ensure thorough understanding and also for the cross fertilization of ideas with colleagues which will provide an opportunity for them to deepen their knowledge. It is also recommended that Universities and Teacher training institutions should develop their curricular to incorporate Modules that specifically address such topics that prove problematic for teachers such as evolution, which will deepen the knowledge of the teachers in the course of their training.

Secondly, the teachers' attitudes may inform their positive attitudes towards the CAPS and curriculum change and may play significant roles in curriculum change implementation as it emerged from the responses of the participants in the study. In order to ensure positive change in the attitudes of the teachers towards the CAPS and curriculum change, it is recommended that teachers should be trained on how to deal with the factors influencing attitudes. The factors influencing attitudes such as stereotyping, selectivity, self-concept, situational factors such as time, needs and emotions as well as how to manage them and build positive attitudes towards curriculum change should be the focus of the workshops. Trained psychologists and counselors may be employed to help the teachers in this regard. The strategies employed in the training should also help the teachers to deal with the psychological aspects of change management. This will enable the teachers to develop positive attitudes towards curriculum change.

#### **5.4 LIMITATIONS OF THE STUDY**

In this study, the application of subjectivity cannot be ruled out since the researcher used his own understanding to interpret the data within the context of the effects of curriculum change on teachers' attitudes and its influence on classroom practices.

#### **5.5 RECOMMENDATIONS FOR FURTHER STUDY**

Based on the findings of this study, the following recommendations are suggested for further study:

- ❖ Expanding the scope of the study by conducting a similar study in all Districts in the Free State to ascertain how other Life Sciences teachers embrace curriculum change and how it influences their attitudes and classroom practices.

- ❖ Compiling a comprehensive programme of action aimed at addressing the effects of curriculum change on teachers' attitudes and its effect on their classroom practices. This will assist the District officials in designing a comprehensive professional development package aimed at preparing the Life Sciences teachers adequately for future curriculum changes and how to cope with it.

## **5.6 CONCLUSION**

The results of this study show that the attitudes of the Life Sciences teachers towards curriculum change do influence their classroom practices. The influence may be positive or negative. Adequate content knowledge in the subject, positive teacher attitudes towards curriculum change, curriculum content that relates to the learners daily lives, positive attitudes towards planning and assessment, simplified curriculum language and user-friendly curriculum materials, as well as adherence to curriculum policy on assessment have been found to promote positive teacher attitudes towards curriculum change.

It was evident from the result of the study that positive teacher attitudes towards curriculum change enhances their classroom practices and promotes successful curriculum change implementation. The importance of professional development in equipping the Life Sciences teachers with the skills and knowledge needed to implement curriculum change is also highlighted. Professional development programs should be adapted to the Life Sciences teachers' level of understanding and should also be conducted in phases or spaced out to ensure maximum memory retention. This will stimulate the development of positive attitudes towards curriculum change and enhanced classroom practices. Although this study was conducted in three schools in the Motheo District, the literature reviewed provided a body of knowledge that will contribute to the understanding of the effect of curriculum change on teachers' attitudes and its influence on their classroom practices. I hope the knowledge generated in this study will assist Life Sciences teachers in coping with curriculum change implementation.

## REFERENCES

- Altinyelken, H.K. 2010. Curriculum change in Uganda: Teacher perspectives on the new thematic curriculum. *International Journal of Educational Development* 30: 15-161.
- Babbie, E. 2010. *The practice of social research*. Belmont: Wadsworth.
- Bantwini, B and McKenzie, E.L.K. 2011. District Officials' Assumptions about Teacher Learning and Change: Hindering Factors to Curriculum Reform Implementation in South Africa. *International Journal of Education* 3(1): 1-25.
- Bantwini, B.D. 2010. How teachers perceive the new curriculum reform: Lessons from a school district in the Eastern Cape Province, South Africa *International Journal of Educational Development* 30: 83-90.
- Baxter, P and Jack, S. 2008. Qualitative case study methodology; study designs and implementation for novice researchers. *The qualitative report* 13: 544-549.
- Blackman, S, Conrad, D and Brown, L. 2012. The attitude of Barbadian and Trinidadian teachers to integration. *International Journal of Special Education* 27(3): 158-168.
- Briant, E and Doherty, C. 2012. Teacher educators mediating curricular reform: anticipating the Australian curriculum. *Teaching Education* 23(1): 51-69.
- Brink, H, Van der Walt, C and Van Rensburg, G. 2012. *Fundamentals of research methodology for health care professionals*. Cape Town: Juta
- Brinkmann, S. 2007. The Good Qualitative Researcher. *Qualitative Research in Psychology* 4(1-2): 127-144.
- Burns, N and Grove, S.K. 2005. *The principles of nursing research: conduct, critique and utilization*. Philadelphia: WB Saunders.
- Cagran, B and Schmidt, M. 2011. Attitudes of Slovene teachers towards the inclusion of pupils with different types of special needs in primary school. *Educational Studies* 37(2): 171-195.

- Carson, D, Gilmore, A, Perry, C and Gronhaug, K. 2001. *Qualitative Marketing Research*. London: Sage Publications.
- Chan, J.K.S. 2012. Curriculum policy implementation: how schools respond to governments 'soft' policy in the curriculum reform. *The Curriculum Journal* 23(3): 371-386.
- Charalambous, Y.C and Philippou, G.N. 2010. Teachers' concerns and efficacy beliefs about implementing a mathematics curriculum reform: integrating two lines of inquiry. *Educational Studies in Mathematics* 75: 1-21.
- Charalambous, Y.C, Philippou, G.N and Kyriakides, L. 2008. Tracing the development of pre service teachers' efficacy beliefs in teaching mathematics during fieldwork. *Educational Studies in Mathematics* 67: 125-142.
- Chisholm, L. 2003. The state of curriculum reform in South Africa: the issue of Curriculum 2005. In Daniel, J, Habib, A and Southall, R. (Eds). *State of the Nation: South Africa 2003–2004*. Cape Town. Human Sciences Research Council.
- Chisholm, L. 2005. The making of South Africa's National Curriculum Statement. *Journal of Curriculum Studies* 37(2): 193-208.
- Chisholm, L and Leyendecker, R. 2008. Curriculum reform in post-1990s sub-Saharan Africa. *International Journal of Educational Development* 28(2): 195-205.
- Cohen, D and Crabtree, B. 2006. Qualitative Research Guidelines Project. <http://www.qualres.org/HomeSemi-3629.html>
- Collinson, V. 2012. Sources of teachers' values and attitudes. *Teacher Development* 16(3): 321-344.
- Creswell, J.W. 2007. *Mixed method research*. London: Sage.
- Cronje, G.J, Du Toit, G.S and Motlatla, M.D.C. 2000. *Introduction to Business Management*. Cape Town: Oxford Publications.
- De Villiers, R. 2011. Student teachers' views: what is an interesting Life Sciences curriculum? *South African Journal of Education* 31: 535-548.

- Desimone, L.M. 2009. Improving Impact Studies of Teachers' Professional Development: Toward Better Conceptualizations and Measures. *Educational Researcher* 38(3): 181-199.
- Emami, F, Omidian, B.N, Hashemi, M.F and Pajoumnia, M. 2013. Teacher's Job Attitudes: Comparison and Relationship between Organizational Commitment and Job Involvement among Physical Education Teachers of Iran. *Australian Journal of Basic and Applied Sciences* 7(1): 7-11.
- Fakier, M and Waghid, Y. 2004. On outcomes-based education and creativity in South Africa. *International Journal of Special Education* 19(2): 53-63.
- Francis, J.J, Johnston, M, Robertson, C, Glidewell, L, Entwistle, V, Eccles M.P and Grimshaw, G.M. 2010. What is an adequate sample size? Operationalising data saturation for theory-based interview studies. *Psychology and Health* 25(10): 1229-1245.
- Gerrard, J and Farrell, L. 2014. Remaking the professional teacher: authority and curriculum reform. *Journal of Curriculum Studies* 46(5): 634-655.
- Gibson, J.L, Ivancevich, J.M, Donnelly Jr, J.H and Konopaske, R. 2006. *Organisations, behaviour, structure, processes*. New York. McGraw-Hill Irwin.
- Gibson, S.E and Brooks, C. 2012. Teachers' perspectives on the effectiveness of a locally planned professional development program for implementing new curriculum. *Teacher Development* 16(1): 1-23.
- Grossoehme, D.H. 2014. Overview of Qualitative Research. *Journal of Health Care Chaplaincy* 20(3): 109-122.
- Ha, S.A, Wong, A.C, Sum, R.K and Chan, D.W. 2008. Understanding teachers' will and capacity to accomplish physical education curriculum reform: the implications for teacher development. *Sport, Education and Society* 13(1): 77-95.
- Hay, C. 2011. Interpreting interpretivism interpreting Interpretations: the new hermeneutics of public administration. *Public Administration* 89(1): 167-182.

- Hudson, P. 2013. Strategies for mentoring pedagogical knowledge, *Teachers and Teaching: theory and practice* 19(4): 363-381.
- Hussain, S, Ali, R.M, Khan, S.M, Ramzan, M and Qadeer, M.Z. 2011. Attitudes of secondary school teachers towards the teaching profession. *International Journal of Academic Research* 3(1): 985-990.
- Ibrahim, A.S, Al-Kaabi, A, and El-Zaatari, W. 2013. Teacher resistance to educational change in the United Arab Emirates. *International Journal of Research Studies in Education* 2(3): 25-36.
- Jacobs, M, and Chalufu, N. 2000. *Curriculum design. In teaching-learning dynamics: A participative approach for OBE*. Cape Town: Juta.
- Jansen, J.D. 1999. Curriculum Reform in South Africa: a critical analysis of outcomes-based education [1]. *Cambridge Journal of Education* 28(3): 321-331.
- Jippes, M, Driessen, E.W, Majoor, G.D, Gijssels, W.H, Muijtjens, A.M.M, Van der Vleuten C.P.M. 2013. Impact of national context and culture on curriculum change: A case study. *Medical Teacher* 35: 651-670.
- Kim, J.R. 2009. Influence of teacher preparation programmes on pre service teachers' attitudes toward inclusion. *International Journal of Inclusive Education* 15(3): 355-377.
- Kramer, B.S, Walker, A.E and Brill J.M. 2007. The underutilization of information and communication technology-assisted collaborative project-based learning among international educators: a Delphi study. *Educational Technology and Research development* 55: 527-543.
- Kruger, M, Won, M and Treagust, D.F. 2013. Teachers' Perceptions on the Changes in the Curriculum and Exit Examinations for Biology and Human Biology. *Australian Journal of Teacher Education* 38(3): 41-58.
- Kvale, S. 2005. The dominance of dialogical interview research: A critical view. *Norsk senter for barneforskning* 3:89-105.

Laforest, J. 2009. *Safety Diagnosis Tool Kit for Local Communities. Guide to Organizing Semi-Structured Interviews with Key Informants*. Québec: Institut national de santé publique du Québec.

Li, Q and Ni, Y. 2012. Debates on the Basic Education Curriculum Reform and Teachers' Challenges in China. *Chinese Education and Society* 45(4): 9-21.

Li, X, Ni, Y, Li, Q and Tsoi, WR. 2013. Influences of Curriculum Reform in Primary Mathematics: A Survey of Instructional Practices. *Chinese Education and Society* 45(4): 22-41.

Lipinge, S.M and Kasanda, C.D. 2013. Challenges associated with curriculum alignment, change and assessment reforms in Namibia. *Assessment in Education: Principles, Policy & Practice* 20(4): 424-441.

Locke, T, Alcorn, N and O'Neill, J. 2013. Ethical issues in collaborative action research. *Educational Action Research* 21(1): 107-123.

Luo, X. 2011. Curriculum Reform In The Course Of Social Transformation. *Cultural Studies* 25(1): 42-54.

Major, C and Savin-Baden, M. 2010. Exploring the relevance of qualitative research synthesis to higher education research and practice. *London Review of Education* 8(2): 127-140.

Makhwathana, R.M. 2007. Effects of curriculum changes on primary schools educators at Vhumbedzi circuit, Limpopo (unpublished mini dissertation) Tshwane University of Technology, Pretoria.

Maodzwa–Taruvunga, M and Cross, M. 2012. Jonathan Jansen and the curriculum debate in South Africa: An essay review of Jansen's writings between 1999 and 2009. *Curriculum Inquiry* 42(1): 126-152.

Marsh, C. 1993. *Key concepts for understanding curriculum*. London: The Falmer Press.



- März, V, and Kelchtermans G. 2013. Sense-making and structure in teachers' reception of educational reform. A case study on statistics in the mathematics curriculum. *Teaching and Teacher Education* 29: 13-24.
- Mason, M. 2006. Outcomes-based education in South African curricular reform: a response to Jonathan Jansen. *Cambridge Journal of Education* 29(1): 137-143.
- Mata, L. 2012. Key Factors of Curriculum Innovation in Language Teacher Education. *World Academy of Science, Engineering and Technology* 66: 512-520.
- Mlitwa, N and Van Belle, J.P. 2010. A Proposed Interpretivist Framework to Research the Adoption of Learning Management Systems in Universities. *Communications of the IBIMA* 2010: 11pp
- Motseke, M. 2005. Why is OBE failing in the township schools of the Free State goldfields? s.n.: 61-73.
- Moyer, J.C, Cai, J, Wang, N and Nie, B. 2011. Impact of curriculum reform: Evidence of change in classroom practice in the United States. *International Journal of Educational Research* 50: 87-99.
- Naong, M.N. 2008. Overcoming challenges of the new curriculum statement – a progress report. s.n. 164-176.
- Ng, S.W. 2009. Why did principals and teachers respond differently to curriculum reform? *Teacher Development: An International Journal of teachers' professional development* 13(3): 187-203.
- O' Reilly, K. 2005. *Ethnographic Methods*. USA: Routledge.
- Okoye, N.S and Okechukwu, R.N. n.d. The effect of concept mapping and problem solving teaching strategies on achievement in Biology among Nigerian secondary school students. *Education is the property of Project Innovation* 131(2): 288-294.
- Onwuegbuzie, A.J and Collins, K.M.T. 2007. A Typology of Mixed Methods Sampling Designs in Social Science Research. *The Qualitative Report* 12(2): 281-316.

- Park, M and Sung, Y.K. 2013. Teachers' perceptions of the recent curriculum reforms and their implementation: what can we learn from the case of Korean elementary teachers? *Asia Pacific Journal of Education* 33(1): 15-33.
- Park, M. 2008. Implementing Curriculum Integration: The Experiences of Korean Elementary Teachers. *Asia Pacific Education Review* 9(3): 308-319.
- Patesan, M and Bumbuc, S. 2010. A theoretical approach to the curriculum reform. *Bulletin Stiintific* 1(29): 66-71.
- Pickens, J. 2005. Attitudes and Perceptions. s.l. s.n.
- Polit, D.F and Beck C.T. 2012. *Nursing research: principles and methods*. Philadelphia, PA: Lippincott Williams and Wilkins
- Priestly, M. 2011. Schools, teachers, and curriculum change: A balancing act? *Journal of Education Change* 12: 1-23.
- Priestly, M. 2011. Whatever happened to curriculum theory? Critical realism and curriculum change. *Pedagogy, Culture and Society* 19(2): 221-237.
- Pudi, T. 2007. 'From OBE to C2005 to RNCS': Are we still on track? *Africa Education Review* 3(1-2): 100-112.
- Quian, H and walker, A. 2013. How principals promote and understand teacher development under curriculum reform in China. *Asia Pacific Journal of Teacher Education* 41(3): 304-315.
- Rabionet, S.E. 2011. How I Learned to Design and Conduct Semi-structured Interviews: An Ongoing and Continuous Journey. *The Qualitative Report* 16(2): 563-566.
- Remillard, J.T. 2009. Part II commentary: Considering what we know about the relationship between teachers and curriculum materials. In Remillard JT, Herbel-Eisenmann, B.A and Lloyd, G.M. (Eds). *Mathematics teachers at work: Connecting curriculum materials and classroom instruction*. New York: Routledge.

- Resh, N and Benavot, A. 2009. Educational governance, school autonomy, and curriculum implementation: diversity and uniformity in knowledge offerings to Israeli pupils. *Journal of Curriculum Studies* 41(1): 67-92.
- Risk, J.L. 2013. Building a New Life: A Chaplain's Theory Based Case Study of Chronic Illness. *Journal of Health Care Chaplaincy* 19(3): 81-98.
- Robbins, S.P, Odendaal, A and Roodt, G. 2004. *Organisational behaviour global and South African perspectives*. Cape Town. Pearson.
- Roehrig, G.H, Kruse, R.A and Kern, A. 2007. Teacher and school characteristics and their Influence on curriculum implementation. *Journal of Research in Science Teaching* 44(7): 883-907.
- Rogan, J.M. 2004. Out of the frying pan...?: Case studies of the implementation of Curriculum 2005 in some science classrooms. *African Journal of Research in Mathematics, Science and Technology Education* 8(2): 165-179.
- RSA DBE, 2011. *Curriculum and assessment Policy Statements Life Sciences (grade 10 – 12)*. Pretoria. Department of Basic Education.
- Ryder, J and Banner, I. 2013. School teachers' experiences of science curriculum reform. *International Journal of Science Education* 35(3): 490-514.
- Ryder, J. 2015. Being Professional: accountability and authority in teachers' responses to science curriculum reform. *Studies in Science Education* 51(1): 87-120.
- Sanders, M and Ngxola, N. 2009. Identifying teachers' concerns about teaching evolution. *Journal of Biological Education* 43(3): 121-128.
- Savage, G.C and O'Connor, K. 2015. National agendas in global times: curriculum reforms in Australia and the USA since the 1980s. *Journal of Education Policy* 30(5): 609-630.
- Seidman, I. 2013. *Interviewing as qualitative research: a guide for researchers in education and social sciences*. 4<sup>th</sup> Edition. New York: Teachers College Press.

- Seikkula-Leino, J. 2011. The implementation of entrepreneurship education through curriculum reform in Finnish comprehensive schools. *Journal of Curriculum Studies* 43(1): 69-85.
- Shriner, M, Schlee, B.M and Libler, R. 2010. Teachers' perceptions, attitudes and beliefs regarding curriculum integration. *The Australian Educational Researcher* 37(1): 51-62.
- Singh, P. 2012. Tobephobia: Teachers' ineptitude to manage curriculum change. *World Academy of Science, Engineering and Technology* 72: 595-602.
- Sinkovics, R.R, Penz, E, Ghauri, P.N. 2008. Enhancing the Trustworthiness of Qualitative Research in International Business. *Management International Review* 48(6): 689-714.
- Spillane J.P, Healey, K and Parise, L.M. 2009. School leaders' opportunities to learn: a descriptive analysis from a distributed perspective. *Educational Review* 61(4): 407-432.
- Spillane, J.P. 2000. Cognition and Policy Implementation: District Policymakers and the Reform of Mathematics Education. *Cognition and Instruction* 18(2): 141-179.
- Spreen, C.A and Vally, S. 2010. Outcomes-based education and its (dis)contents: Learner-centred pedagogy and the education crisis in South Africa. *Southern African Review of Education* 16(1): 39-58.
- Strauss, A. L. and Corbin, J.M. 1998. *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory*. London: Sage.
- Stutchbury, K. and Fox, A. 2009. Ethics in educational research: introducing a methodological tool for effective ethical analysis, *Cambridge Journal of Education* 39(4): 489-504.
- Teddlie, C and Yu, F. 2007. Mixed Methods Sampling: A Typology With Examples. *Journal of Mixed Methods Research* 1(1): 77-100.
- Teo, T.W. 2013. Examining the performative quality of a teacher's curriculum reform making through a metaphorical lens. *Education as Change* 17(1): 89-100.

- Thompson, A.R, and Russo, K. 2012. Ethical Dilemmas for Clinical Psychologists in Conducting Qualitative Research. *Qualitative Research in Psychology* 9(1): 32-46.
- Tong, S.Y.A. 2010. Lessons Learned? School leadership and curriculum reform in Hong Kong. *Asia Pacific Journal of Education* 30(2): 231-242.
- Tracy, K and Robles, J.S. 2010. Challenges of Interviewers' Institutional Positioning: Taking Account of Interview Content and the Interaction, *Communication Methods and Measures* 4(3): 177-200.
- Troudi, S and Alwan, F. 2010. Teachers' feelings during curriculum change in the United Arab Emirates: opening Pandora's Box. *Teacher Development* 14(1):107-121.
- Van Veen, K and Slegers, P. 2006. How does it feel? Teachers' emotions in a context of change. *Journal of Curriculum Studies* 38(1): 85-111.
- Van Wyk, G. 2013. The professional development of Life Science teachers' pedagogical content knowledge and profile of implementation concerning the teaching of DNA, Meiosis, Protein synthesis, and Genetics within a community of practice. (Unpublished dissertation.) University of Johannesburg, Johannesburg.
- Walker, A, Recker, M, Ye, L, Robertshaw, M.B, Sellers, L and Leary, H. 2012. Comparing technology-related teacher professional development designs: multilevel study of teacher and student impacts. *Educational Technology Research and Development* 60: 421-444.
- Wallace, C.S and Priestley, M. 2011. Teacher beliefs and the mediation of Curriculum innovation in Scotland: A socio-cultural perspective on professional development and change. *Journal of Curriculum Studies* 43(3): 357-381.
- Wang, H. 2010. Translating policies into practice: the role of middle-level administrators in language curriculum implementation. *The Curriculum Journal* 21(2): 123-140.
- Wholey, J.S, Hatry, H.P and Newman, K.S (Eds). 2010. *Hand book of practical program evaluation*. New York: John Willey and Sons.

Williams, E.N, and Morrow, S.L. 2009. Achieving trustworthiness in qualitative research: A pan-paradigmatic perspective, *Psychotherapy Research* 19(4-5): 576-582.

Wood, R and Butt, G. 2014. Exploring the use of complexity theory and action research as frameworks for curriculum change, *Journal of Curriculum Studies* 1-21.

Yeung, S.S. 2010. Using School Evaluation Policy to Effect Curriculum Change? A Reflection on the SSE and ESR Exercise in Hong Kong. *Educational Research Journal* 25 (2):187-209.

## ANNEXURE A: ETHICAL CLEARANCE

UNIVERSITY OF THE  
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VRYSTAAT  
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31 October 2013

### *REVISITING THE TEACHING THE TEACHING AND LEARNING OF LIFE SCIENCES IN SCHOOLS: A CURRICULUM CHANGE PERSPECTIVE*

Dear Mr Okwara

With reference to your application for ethical clearance with the Faculty of Education, I am pleased to inform you on behalf of the Ethics Board of the faculty that you have been granted ethical clearance for your research.

Your ethical clearance number, to be used in all correspondence, is:

**UFS-EDU-2013-065**

This ethical clearance number is valid for research conducted for one year from issuance. Should you require more time to complete this research, please apply for an extension in writing.

We request that any changes that may take place during the course of your research project be submitted in writing to the ethics office to ensure we are kept up to date with your progress and any ethical implications that may arise.

Thank you for submitting this proposal for ethical clearance and we wish you every success with your research.

Yours sincerely,

A handwritten signature in blue ink, appearing to read 'A Barclay', written over a horizontal line.

Andrew Barclay

Faculty Ethics Officer

## ANNEXURE B: PERMISSION FROM THE FREE STATE DEPARTMENT OF EDUCATION

Enquiries: Motshumi KK  
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### OFFICE OF THE DIRECTOR: STRATEGIC PLANNING, POLICY DEVELOPMENT & RESEARCH

01 November 2013

Dear Mr Okwara VU.

#### RE: APPROVAL TO CONDUCT RESEARCH IN THE FREE STATE DEPARTMENT OF EDUCATION

1. This letter serves as an acknowledgement for receipt of your research request in the Free State Department of Education towards a PhD thesis.
2. Research topic: **Revisiting the teaching and learning of Life Science in schools: a curriculum change perspective.**
3. Approval is granted for you to conduct research in the Free State Department of Education.
4. This approval is subject to the following conditions:-
  - 4.1 The names of participants involved remain confidential.
  - 4.2 The questionnaires are completed and the **interviews are conducted outside normal tuition time or during free periods.**
  - 4.3 This letter is shown to all participating persons.
  - 4.4 A bound copy of the research document and a soft copy on a computer disc should be submitted to the Free State Department of Education (Strategic Planning, Policy Development & Research).
  - 4.5 You will be expected, on completion of your research study, to make a presentation to the relevant stakeholders in the Department.
  - 4.6 The attached ethics document must be adhered to in the discourse of your study in our department.
5. The costs relating to all the conditions mentioned above are your own responsibility.
6. You are requested to confirm acceptance of the above conditions in writing, within seven days after receipt of this letter. Your acceptance letter should be directed to:

**DIRECTOR: STRATEGIC PLANNING, POLICY DEVELOPMENT AND RESEARCH,  
Old CNA Building, Maitland Street OR Private Bag X20565, BLOEMFONTEIN, 9301**

Thank you for choosing to research with us. We wish you every success with your study.

Yours faithfully,

  
**M. MOTHEBE (DIRECTOR: STRATEGIC PLANNING, POLICY DEVELOPMENT & RESEARCH)**

Directorate: Strategic Planning, Policy Development & Research - Private Bag X20565, Bloemfontein, 9300 – Room 301, Old CNA building,  
Charlotte Maxeke, Bloemfontein 9300 - Tel: 051 404 9283/ Fax: 086 6678 678 E-mail: [research@edu.fs.gov.za](mailto:research@edu.fs.gov.za)

[www.education.fs.gov.za](http://www.education.fs.gov.za)



## ANEXURE C: PERMISSION FROM PRINCIPALS

Valentine Okwara  
PO box 6584,  
Bloemfontein 9300  
01 March 2014

The Principal

Dear Sir / Madam,

### **APPLICATION FOR PERMISSION TO CONDUCT RESEARCH STUDY FOR M.Ed. IN CURRICULUM STUDIES IN YOUR SCHOOL**

I would like to ask for your permission to interview the Life Sciences teachers teaching grade 10, 11 and 12 in your school. The interview is for the purpose of a research study titled **Revisiting the teaching and learning of Life Sciences in schools: the effect of curriculum change on teacher attitudes** and your school is one of the designated secondary schools in the Motheo district of the Free State where data will be collected. The research study is aimed at exploring the attitudes of Life Sciences teachers towards curriculum changes and how it affects their classroom practices. It will be conducted as a requirement for the degree of Magister Educationis (M.Ed.) in the field of Curriculum studies in the University of the Free State, in Bloemfontein.

The duration of data collection for the study is from March 2014 till October 2014. Data collection for the study will be through semi - structured interviews of Life Sciences teachers during normal class periods for about 30 minutes or during their free time (break time) during school hours to minimise the disruption of classes.

Thanking you Sir / Madam in anticipation of your cooperation

Yours in Education,

OKWARA, Valentine Ukachukwu.

## ANNEXURE D: INFORMED CONSENT LETTER

Valentine U Okwara

PO Box 6584,

Bloemfontein 9300,

078 3932543

Dr JPH Pretorius

University of the Free State

PO Box 339

Bloemfontein 9300

0514013340

01 March 2014

### INFORMED CONSENT

Dear Respondent,

I would like to invite you to take part in this research project:

**Revisiting the teaching and learning of Life Sciences in schools: the effect of curriculum change on teacher attitudes.** This study is about collecting data on the attitudes of grade 10, 11 and 12 Life Sciences teachers on curriculum changes and how it affects their teaching and learning of the subject.

I would like you to participate with us in this research because you are teaching grade 10, 11 and 12 Life Sciences where the CAPS curriculum is currently being implemented. The reason I am doing this study is to understand the attitudes of the Life Sciences teachers regarding curriculum changes and how it affects their classroom practices.

The possible risks to you taking part in this study is missing your one or two teaching periods and I have taken the following steps to protect you from these risks – I have permission from your principal for you to participate in this study. I am sure you will benefit from this study as it will expose you to different attitudes of teachers with reference to curriculum changes and how it affect their classroom practices.

While I greatly appreciate your participation in this important research study and the valuable contribution you can make, your participation is entirely voluntary and you are under no obligation to take part in this study. If you do choose to take part, and an issue arises which makes you uncomfortable, you may at any time stop your participation with no further repercussions.

If you experience any discomfort or unhappiness with the way the research is being conducted, please feel free to contact me directly to discuss it, and also note that you are free to contact my study supervisor (indicated above)

Should any difficult personal issues arise during the course of this research, I will endeavour to see that a qualified expert is contacted and able to assist you.

Yours Sincerely,

OKWARA, Valentine Ukachukwu

## ANNEXURE E: SEMI-STRUCTURED INTERVIEW QUESTIONS

<ol style="list-style-type: none"> <li>1. Are you up-to-date with the necessary content knowledge in Life Sciences? If not in which topics do you need support?</li> <li>2. Is the new Life Science CAPS curriculum providing you with any challenges?</li> <li>3. If so which parts of the CAPS curriculum contents provide you with the biggest challenge?</li> <li>4. Are the challenges related to your inadequate knowledge of the contents?</li> <li>5. What do you think about the assessment system prescribed by the CAPS?</li> <li>6. Do you adhere strictly to the prescription policy on assessment by the CAPS? If not, why?</li> <li>7. What is your attitude towards the new Life Sciences CAPS curriculum?</li> <li>8. Which factors influence your attitude towards the new Life Science curriculum? Elaborate</li> <li>9. Does your attitude affect your assessment?</li> </ol>	<ol style="list-style-type: none"> <li>10. Are you confident enough in teaching Life Sciences?</li> <li>11. Do you think the Life Science curriculum relates to the everyday lives of the learners?</li> <li>12. Do you look forward in anticipation when you have to present Life Sciences classes?</li> <li>13. Are you up-to-date with your planning?</li> <li>14. Do you regard planning as an important part of education?</li> <li>15. How much time do you spend on planning each week?</li> <li>16. Does your attitude affect your planning?</li> <li>17. Are you up-to-date with your assessment?</li> <li>18. Does your overall attitude to the new curriculum influence your classroom practices at all? If so how?</li> </ol>
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