

**CURRICULUM LEADERSHIP ROLE OF SUBJECT ADVISORS FOR  
MATHEMATICS IMPROVEMENT IN SOUTH AFRICA**

**by**

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**A thesis submitted in fulfilment of the requirements for the degree**

**Philosophiae Doctor in Mathematics (Curriculum Studies)**

**in the**

**School of Mathematics, Natural Sciences and Technology Education**

**FACULTY OF EDUCATION**

**at the**

**UNIVERSITY OF THE FREE STATE**

**BLOEMFONTEIN**

**MAY 2020**

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## DECLARATION

I, THABO FRANCE SITHOLE, declare that the thesis entitled *CURRICULUM LEADERSHIP ROLE OF SUBJECT ADVISORS FOR MATHEMATICS IMPROVEMENT IN SOUTH AFRICA* that I hereby submit for the PhD Degree in Mathematics Education qualification at the University of the Free State, is my own independent work, and that I have not previously submitted it for a qualification at another institution of higher education. I am aware that the copyright is vested in the University of the Free State. I also declare that all royalties as regards intellectual property that was developed during and/or in connection with the study at the University of the Free State will accrue to the University. In the event of a written agreement between the University and the student, the written agreement must be submitted in lieu of the declaration by the student.



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T.F. SITHOLE

Date: 31/07/2020

## DEDICATION

This thesis is dedicated to

my late father, MHLOBO KNIFE, who always said to me, “never stop learning because you will die suffering”,

my mother, NTOMBIZONKE ANNA SELINA RHODA SITHOLE,

my late brother, JOE,

my late sister, ALICE,

my late sister, THAMARY,

and

the entire SITHOLE family, for their uncompromising principles that guided me.

I cherish your values and ethos for your immense contribution to my education.

My efforts would not have been possible without your guidance and love.

Thank you for leading your children into intellectual pursuits.

## ACKNOWLEDGEMENTS

Firstly, I would like to thank my supervisor, Dr Simon A. Tachie, for providing detailed and insightful feedback at every stage of the writing process. Dr Tachie, my final thesis would not have been possible without the professional support and critical advice that I received from you. It has been a privilege to work under your guidance and leadership. Thank you very much for being my supervisor and for your constructive criticism.

I also want to thank the Dean of the Faculty of Education, Prof. Loyiso Jita for his brilliant mind and his unfaltering devotion to Mathematics, Technology and Science education. Most of all, Prof. Jita inspired me with his unique ability to bring out the best in those around him, his warm and generous spirit and his courage. In addition, I would like to thank Prof. Jita, incumbent of the SANRAL Chair in Mathematics, Natural Science and Technology Education at the University of the Free State, for arranging a bursary from the National Research Foundation to fund my studies in 2018. Furthermore, I would like to acknowledge the support provided by the University of Free State to fund my studies in 2019.

I would also like to thank my cousins, brothers and sisters: Medson, Dumisani, Nkosinathi, Owani, Siyabonga, Khulekani, Sithembiso and Sinethemba, who supported me through difficult times and continue to inspire and encourage me.

I also want to thank my colleagues for the support, advice and encouragement that they offered me.

To the 2018 Master's and PhD cohort, I salute and respect you.

To my wife Libuseng, who remained resolute in the upbringing of our children, helping them with schoolwork in my absence. You have been not only my wife and the mother of my children, but my rock of ages and pillar of strength. Thank you very much for your support and for believing in me on that I have the potential.

Besides this, I would like to sincerely thank the Mathematics subject advisors and educators who participated in this study. This study is based on your collective wisdom, and without you, this research would not have been possible.

I want to thank Hettie Human, Dr Sindiso Zhou and Dr Cilla Dowse in a special way for editing my work, at times doing so under pressure. This research project is a testament to your skills and care in providing me with valuable critiques and suggestions to make this research project a success.

A word of thanks goes to the Free State Department of Basic Education and SETA for funding my studies in 2018. In addition, I would like to thank the Free State Department of Basic Education and school principals for granting me permission and access to conduct research in their schools.

Above all, I would like to thank God Almighty for giving me the strength and courage to persevere.

*“I can do all things through Christ, who strengthens me”*

## **ABSTRACT**

The aim of the study was to explore the curriculum leadership role of Mathematics subject advisors for Mathematics improvement in South Africa. Researchers in developing countries have struggled to describe and capture the curriculum leadership role of Mathematics subject advisors and the way it influences learner achievement results in Mathematics. In the same vein, their counterparts in developed countries also continue to struggle to document actual success stories of the curriculum leadership role of Mathematics subject advisors in improving the teaching and learning of Mathematics. To the best of the researcher's knowledge, not many studies focusing on curriculum leadership and the role of subject advisors for Mathematics improvement have been conducted in the South African context.

This qualitative case study convenience and purposively sampled Mathematics subject advisors and ten Mathematics educators in all the five districts of the Free State province in South Africa. Data were collected through in-depth semi-structured interviews, observations and document analysis. Data was coded according to the eight steps of Tesch (1990).

The study established that the curriculum leadership role of subject advisors includes but is not limited to providing support and guidance to educators, educator appraisal, monitoring, controlling educators and learners' work books, mentoring and developing educators' professionally. In addition, subject advisors are tasked with carrying out administrative work including the provision of resources and paper work such as using monitoring tools. While all subject advisors tried to get the best possible learner achievement in Mathematics, they managed and led their schools differently. Some reflected on previous strategies while others worked according to the availability of resources. In addition, the individual educational philosophies of the subject advisors played a role. Besides this, the study established that subject advisors do not operate in isolation. The interactions amongst subject advisors, principals, educators, learners and the context are important in promoting subject advisors' effective curriculum leadership. Lastly, none of the subject advisors that were interviewed knew everything that was going on in his or her subject area. Some of the interviewed subject advisors did not major in Mathematics or a science-related subject. The subject advisors in this study each pointed out that they need training in

specific areas such as the management and leadership of supporting progressed learners. It is in this vein that the findings of this study may be used by scholars in future to assist in the development of a standardised model, which can be used to inform leadership training of Mathematics subject advisors wishing to improve subject advisors' curriculum leadership role, and which would then influence educators' classroom and teaching practices and learners' performance.

**Keywords:** Curriculum leadership, subject advisors, Mathematics, Curriculum and Assessment Policy Statement (CAPS), cognitive theory

## **LIST OF ABBREVIATIONS AND ACRONYMS**

ACE	Advanced Certificate in Education
AMESA	Association of Mathematics Educators in South Africa
ANA	Annual National Assessment
APIP	Academic Performance Improvement Plan
BEd.	Bachelor of Education
BSc.	Bachelor of Science
CAPS	Curriculum Assessment and Policy Statement
CEPD	Centre for Educational Policy Development
CES	Chief Education Specialist
CBAM	Concern-based Adoption Model
CUT	Central University of Technology
DBE	Department of Basic Education
DoE	Department of Education
DSG	Developmental Support Groups
EEA	Educator Employment Act
FET	Further Education and Training
FSDBE	Free State Department of Basic Education
GET	General Education Training
HoD	Head of Department
HR	Human Resources
IQMS	Integrated Quality Management System
LTSM	Learning and Teaching Support Material
MASTEC	The Mathematics, Science and Technology College
MBWA	Managing by Wandering Around
MEC	Member of Executive Council
MSc.	Master of Science
NAPTOSA	National Professional Teachers' Organisation of South Africa

NATU	National Teachers' Union
NCS	National Curriculum Statement
NSC	National Senior Certificate
NEEDU	National Education Evaluation and Development Unit
NGO	Non-Governmental Organisation
NSC	National Senior Certificate
OBE	Outcomes Based Education
OECD	Organisation for Economic Co-operation and Development
PGDE	Post Graduate Degree in Education
PGCE	Postgraduate Certificate in Education
PGP	Professional Growth Plan
PL	Post Level
PLC	Professional Learning Community
PGP	Personal Growth Plans
PU for CHE	Potchefstroom University for Christian Higher Education
REQV	Relative Qualification Value
SAASTE	South African Association of Science and Technology Educators
SACE	South African for Educators
SACMEQ	Southern and Eastern Africa Consortium for Monitoring Educational Quality
SADTU	South African Democratic Teachers Union
SBA	School Based Assessment
SGB	School Governing Board
SIP	School Improvement Plan
SMT	School Management Team
SPAM	School Performance Appraisal Meeting
SPR	School Performance Review
SYSTEM	Students and Youth into Science, Technology, Engineering and Mathematics

TIMSS	Trends in International Mathematics and Science Study
TTA	Teacher Training Agency
UK	United Kingdom
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNICEF	United Nations International Children's' Education Fund
UFS	University of the Free State
USA	United States of America

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# CHAPTER 1

## THE PROBLEM AND ITS CONTEXT

### 1.1 INTRODUCTION

Curriculum refers to what a learner is supposed to encounter, study, practise and master. It entails decisions about what “should be taught, how it should be taught and when it should be taught” (FSDBE, 2013:15). To achieve this, commitment to good leadership qualities in curriculum development should be established. Leadership involves an attempt to influence others to achieve favourable outcomes. According to Jita and Mokhele (2013:S124), “Instructional leadership encompasses directing such influence towards instructional decisions for better achievement of learning objectives”. Curriculum leadership is a global issue and has become an increasingly common concern in America, Europe and Asia, and particularly in developing countries (Atteberry, Bryk, Walker & Biancarosa, 2008). In Africa, however, research on curriculum leadership is still in its infancy.

Curriculum leadership has emerged as crucial for improving the quality of teaching and learning of mathematics around the world. Reports and research studies indicate that curriculum leadership is an important factor in promoting effective teaching and learning. Curriculum leadership is also key to improving both educators’ classroom practices and learner achievement, which ultimately leads to success in organisations, as claimed by Earley and Weindling (2004). This aspect of leadership needs to be extended to Mathematics classrooms to enhance effective teaching and learning of mathematics in the classroom. Research suggests that Mathematics subject advisors do not have the required skills and competencies to fulfil their curriculum leadership roles, as they have not been prepared for the job of subject advisor, of which there are many expectations (Turner, 2003). Subject advisors learn mostly on the job, while some use their intuition to understand the tasks they are expected to execute. Moreover, subject advisors’ scope of work is broad; hence, they lack the time to execute the curriculum leadership role (Bak, 2010; Roulston, 2010; Zepeda & Kruskamp, 2007; Deussen, Coskie, Robinson and Autio, 2007).

Mathematics is considered of central importance in modern society, providing the vital, qualities needed to be successful in today's world. Owusu (2013) assert that in Ghana, Mathematics is a compulsory subject in schools with the government continuously working at improving learner achievement results in Mathematics. However, learner achievement results in Mathematics remain low globally. Huggins, Scheurich and Morgan (2011) point out that learner achievement in Mathematics is determined by the quality of the educators with the root cause of poor learner achievement results in Mathematics being traced to educators. In turn, educator quality is influenced by the types of support and guidance offered to educators by Mathematics subject advisors through their leadership commitment (Ribbins, 1997; Kahn and Levy, 1995).

This chapter, which introduces the study, provides an overview of the problem and its context. It presents the background of the study, problem statement, followed by the rationale, purpose of the study, research questions, research aims and objectives and the study's delimitations and limitations.

## **1.2 BACKGROUND TO THE STUDY**

It remains a question for both politicians and educationist whether subject advisors' curriculum leadership can be considered a solution for improving educator classroom practices as well as learner achievement results in Mathematics (Letseka, Bantwini & King-McKenzie, 2012; RSA, 2011a). The idea of curriculum leadership has gained prominence both in international and national debates to such an extent that it has become an internationally accredited reform strategy. Curriculum leadership often forms part of initiatives that are designed to improve the efficacy, quality and equity of Mathematics teaching and learning in secondary schools (Whitby, 2010). Curriculum leadership has been practised in America, Europe, Asia, India, Pakistan, Kenya, Namibia, Nigeria and Botswana (Jita & Mokhele, 2012), and South Africa is not exempt from this educational reform practice. The conceptualising of what curriculum leadership is and should be about is not always shared, despite curriculum leadership being common practice in these countries. Jita and Mokhele (2012), acknowledging the paucity of information on the usefulness of the role of subject advisors' curriculum leadership, posit that little is known about how subject

advisors' curriculum leadership is enacted, what they focus on and the manner in which they develop educators.

The view that grouping districts and schools into professional learning communities will help educators' professional growth, improve their classroom practices as well as make education responsive to local needs and improve learner achievement results in Mathematics, is an assumption of advocates of interaction between schools and subject advisors such as Tsotetsi and Mahlomaholo (2015); Ng, Nguyen, Wong and Choy (2015) as well as Pomuti and Weber (2012). Both Tremblay (2017) as well as Jita and Ndlalane (2009), view districts and schools as a form of professional community providing a contextual setting within which educators, Heads of Department (HoDs) and subject advisors can come together and improve their instructional practices. Goddard *et al.* (2010) emphasise that subject advisors can motivate and collaborate with schools to share resources and experience, and craft expertise and practices that will help schools to improve their classroom practices. Maphosa *et al.* (2013), acknowledging the importance of subject advisors' curriculum leadership role, state that subject advisors promote professional learning communities that create a platform to meet, experiment with new ideas and share best practices to improve the teaching and learning of mathematics. Lock (2011) is of the view that subject advisors create a platform for educators to share and support each other on instructional practices. In addition, subject advisors' curriculum leadership aims to address equity issues in delivering quality education, access, participating in higher levels of schooling and in addressing disparities in learner achievement amongst schools, as claimed by Giordano (2008). Hallinger and Heck (2010) assert that such efforts to improve teaching and learning as well as raise learner achievement in Mathematics, comprise what is often referred to as curriculum leadership.

Despite the widespread introduction of subject advisors' curriculum leadership role in several countries, critics have frequently questioned the validity of the claims on its usefulness by drawing attention to national and international circumstances that militate against effective and efficient curriculum leadership implementation. For instance, research conducted by Weber (2012) in Namibia revealed that subject advisors' curriculum leadership role was far from being successful in realising its goals because educators had negative attitudes toward the curriculum reform

strategy. It also found that there were no guidelines or regulatory framework guiding the curriculum leadership role of subject advisors. Aipinge (2007) contends that a number of challenges hinder the implementation of subject advisors' curriculum leadership role, thereby confirming Pomuti and Weber's claim. These challenges include inadequate resources and a lack of system support. Several curriculum leadership studies such as Blasé and Blasé (2004) and Mangin (2007) have also cited these challenges as militating against effective subject advisors' curriculum leadership practices in most schools. Jita and Mokhele (2012) made a similar observation of educator leadership in South Africa, arguing that the institutionalisation of educator leadership may have the adverse effect of curtailing collaboration, leadership and learning of educators. Hammond and Richardson (2009) and Hughes *et al.* (2010) concur that long distances travelled by subject advisors to schools, lack of resources and structures constitute some of the challenges affecting subject advisors' curriculum leadership effectiveness. Uirab (2006). Aipinge (2007) and UNICEF (2009) argue in favour of the curriculum leadership role of subject advisors, contrary to Pomuti and Weber's (2012) claim, even though they suggest that the above factors need to be addressed jointly by all stakeholders. The controversies surrounding the curriculum leadership role of subject advisors clearly indicate the need for research on their viability as curriculum reform strategies for improving teaching and learning of Mathematics. Globally, researchers view the efforts to improve learner achievement results by improving educators' classroom practices as curriculum leadership (Chappuis, Chappuis & Stiggins, 2009). Informed by the backdrop of the different promises and challenges of subject advisors' curriculum leadership role, it was appropriate to investigate their viability as curriculum reform agents for achieving improved learner achievement results by influencing educators' teaching and students' learning practices in secondary schools.

Little research has been done in South Africa on the curriculum leadership role of Mathematics subject advisors, how Mathematics subject advisors perceive their roles, and what is expected of Mathematics subject advisors by their principals, local education districts, educators or the subjects they lead. Even lesser has been done on what mathematics subject advisors actually do and whether their activities correspond with what is prescribed by the policy documents. As claimed by Mestry

and Grobler (2002), not many studies have focused on Mathematics subject advisors' curriculum leadership at secondary schools. Hoadley, Christie and Ward (2009) point out that when curriculum leadership is addressed, the studies focus on the roles and responsibilities of heads of schools as curriculum leaders, including the teaching and learning of Mathematics. Koh, Gurr, Drysdale and Ang (2011) concur that there is limited research on Mathematics subject advisors' curriculum leadership.

The current study places Mathematics subject advisors at the centre of curriculum leadership. It sought to investigate the manner in which Mathematics educators perceive subject advisors' curriculum leadership role and the types of support that Mathematics educators receive from Mathematics subject advisors. Hoadley *et al.*'s (2009) study is one of a few conducted in South Africa, where mathematics subject advisors' curriculum leadership role was explored. York-Barr and Duke (2004) and Lai and Cheung (2013) argue that there are frameworks and studies from other countries on what Mathematics subject advisors should do, but empirical research on Mathematics subject advisors' curriculum leadership, their practices and their actual work is very limited.

This claim is validated by Peloagae (2010), what very few research studies have focused on mathematics subject advisors' curriculum leadership role with most studies tending to concentrate on school principals and educators as curriculum leaders. Peloagae (2010) asserts that challenges exist regarding Mathematics subject advisors' curriculum leadership and these challenges need to be addressed jointly by all stakeholders. This problem is not unique to South Africa, but it is also prevalent in countries such as Nigeria (Olorundare, 1990), the United Kingdom (Miller, 2011), Kenya, Zambia and Ghana (Umalusi, 2008; RSA, 2011). In addition, existing and emerging research suggests that educators in the South African Mathematics education system often struggle to decide systematically on what to teach, how to teach it and when to teach it (Brodie, Shalem, Sapire & Monson, 2008). The teaching of Mathematics requires an educator who is creative and well-grounded in the content, and who can adapt the teaching tasks to achieve the desired learner achievement results. Thus, there is need to conduct more research on the curriculum leadership role of mathematics subject advisors, particularly on the

support, mentorship, guidance and direction they give to Mathematics educators, which, in turn, influences effective teaching and learning of mathematics.

### **1.3 PROBLEM STATEMENT**

Curriculum leadership emerged formally in the 19th century and has since become a worldwide phenomenon (Giordano, 2008). The major aim for curriculum leadership was to improve the efficacy and quality of teaching and learning in schools. According to Muijs (2008), educators from schools with professional learning communities show less stress and challenges in implementing a new curriculum, whereas marginalised communities benefit more when educators share resources, leadership and expertise. Hallinger (2009) asserts that the objectives of curriculum leadership are to improve school management, school supervision as well as teaching and learning. Pomuti and Weber (2010) are of the opinion that most activities of professional learning communities have a direct impact on curriculum leadership since they are directed towards improving Mathematics teaching and learning. In spite of the global use of professional learning communities, there are still many controversial issues regarding their usefulness as vehicles for curriculum delivery in schools. The viability of professional learning communities and the role played by subject advisors in strengthening the impact of Professional Learning Communities (PLCs) on improving educators' classroom practices has been the subject of debate for decades as claimed by Jones (2009). Commentary and research from Canada, Australia, the United States of America (USA), Europe, Asia and the United Kingdom (UK) suggest an enduring stream of concern regarding subject advisors' curriculum leadership role and the manner it influences and shapes educators' classroom practices.

In Australia, the purpose of the Commonwealth government was to improve the quality of teaching and learning in Mathematics, with the aim of improving the effectiveness of schools and improving learners' achievement results in the subject (Ng, Nguyen, Wong and Choy, 2015). In this regard, Verger, Altinyelken and Koning (2013) argue that effective teaching is a prerequisite for effective learning by learners. From the researchers' point of view, teaching practice is the most influential factor in learner achievement results in Mathematics, as it integrates theory and practice. After realising that Mathematics educators' training had not been effective

in improving learners' achievement results in Mathematics (Wenger, McDermott and Snyder, 2002), it has become the researchers' passion, as a principal, mathematics HoD and educator, to discover what is needed to become an effective mathematics educator. As advocated by Roach, Kratochwill and Frank (2009) as well as May, Huff and Goldring (2012), the researcher's desire was to determine how Mathematics subject advisors can support, assist, guide, direct and mentor educators, with the intention of improving learner achievement results in Mathematics. It was deemed essential to explore the Mathematics subject advisors' curriculum leadership role, focusing was on the experiences, ideas, thoughts, beliefs, perceptions, concerns and interpretations of Mathematics reform policies by Mathematics subject advisors, because this is where most of the challenges of Mathematics teaching occur during the process of learning to teach as well as Mathematics teaching and learning. This study, which was on Mathematics subject advisors' curriculum leadership role, explores learning to teach through practice. According to Vanderburg and Stephens (2010), learning to teach is an on-going process that lasts a lifetime, and which is considered a product of the interactions between practice and beliefs.

#### **1.4 RATIONALE FOR THE STUDY**

Researchers in developing countries have struggled to describe and capture the curriculum leadership role of Mathematics subject advisors and the manner in which it influences learner achievement results in the subject. In the same vein, their counterparts in developed countries also continue to struggle to document actual success stories of the curriculum leadership role of Mathematics subject advisors in improving the teaching and learning of the subject. To the best of the researcher's knowledge, not many studies have focused on curriculum leadership and the role of subject advisors for Mathematics improvement in South Africa; hence, the present study attempts to address this problem.

The researcher had an advantage in exploring the Mathematics subject advisors' curriculum leadership role in South Africa based on his experiences as a principal (for 4 years), Mathematics HoD (for 6 years) and educator for the past 12 years. He noted that the support and mentorship given to educators by Mathematics subject advisors is generally poor, hence the need to explore the curriculum leadership role of Mathematics subject advisors. The study sought to expand research on subject

advisors' curriculum leadership at secondary schools, with particular reference to the support, guidance and direction that they give to educators. Literature suggests that leaders can be grouped into two main categories, namely formal and informal leaders. Informal leaders are what Jita, speaking at the (South African) National Teachers Awards in November 2014, referred to as the 'cream' of the education system (National Teachers Awards, 2014). He emphasised that the 'cream' – winners, irrespective of their positions – should return to their respective districts and schools, coach and train other educators on curriculum-related issues. This study thus took into account both these categories of subject advisors as curriculum leaders, as set out by Firestone and Martinez (2007).

The present research was triggered by, among other things, the National Education Evaluation and Development Unit (NEEDU) report of December 2013, subject advisors' reports and the National Diagnostic Report of the Department of Basic Education (FSDBE, 2014), which all point to national concern about curriculum leadership. A team of NEEDU staff evaluating the teaching and learning of Mathematics in the Xhariep district of the Free State province, for example, identified several weaknesses in the way in which mathematics was being taught and learnt at school (FSDBE, 2013). Outdated methods and strategies of teaching and learning, and insufficient knowledge of mathematics content among educators were found to contribute to a high level of learner failure (RSA, 2011b). Under-qualified and lack of properly qualified educators teaching in classrooms that are overcrowded and lacking in equipment also contributed to learners' failure (UNESCO, 2017). Previous research identified poor planning as a problem, with lesson plans not being submitted and checked regularly (DBE, 2013). In addition, subject meetings seem to be held randomly, without properly written guidelines. Poor communication was reported as a challenge, with educators and subject advisors not specifying the goals and objectives of their departments (FSDBE, 2015). NEEDU reports that learners' workbooks are not checked regularly by subject advisors, that the teaching of Mathematics is not aligned with curriculum outcomes, learners do not do their homework and syllabi for Grades 10 and 11, in particular, had not been completed at the time of evaluation (FSDBE, 2013). It was suggested by the provincial department officials that these challenges had, in part, resulted in the observed and unacceptable failure rate in Mathematics by learners in Grade 12.

In addition to the challenges relating directly to the teaching and learning of Mathematics, school organisation was generally reported to be unsatisfactory (RSA, 1995a). There was poor organisation of the way assessment should be done, when it should be done, by whom it should be done and the manner in which it should be done and no assessment guidelines were evident in educator portfolios. Lastly, curriculum challenges were pointed out in terms of coverage, content knowledge of educators, depth of assessment and the alignment of objectives to curriculum assessment standards (DBE, 2013; Spaul, 2014).

These findings confirm that the role and place of subject advisors' curriculum leadership at secondary schools are worth exploring, because subject advisors are responsible for conducting and organising workshops for educators and subject advisors, to help them with planning, organising, monitoring, evaluating, controlling and leading. At present, it is not clear whether and how subject advisors execute their duties of curriculum leadership for Mathematics at schools. According to the Department of Basic Education's (2018) national diagnostic tool, some Mathematics educators lack content knowledge in certain topics, such as trigonometry, Euclidean geometry and probability. Subject advisors are responsible for the professional development of educators and they must identify educators who should attend development workshops. However, it is unclear whether and how subject advisors are actively involved in this key role of curriculum leadership. Moreover, the challenges and opportunities that subject advisors encounter in curriculum leadership are not known. Existing literature suggests that the problem of learners failing Mathematics can be minimised (remedied) if subject advisors' curriculum leadership of the subject is given maximum attention (Spillane & Orlina, 2005). Zepeda and Kruskamp (2007), Leon (2010) as well as Spaul (2014) recommend more research on the curriculum leadership role of subject advisors, in order to understand the support and nature of subject advisors giving guidance and direction duties. Poopedi (2011), a South African researcher, recommends that subject advisors' curriculum leadership role be studied continuously due to the complexities of leadership, management and teaching and learning dynamics.

There is an urgent need to understand the why, what and the how parts of subject advisors' curriculum leadership practices, in an attempt to improve Mathematics curriculum leadership. Another point is that the perceptions and interpretations of

and assigning of meaning by subject advisors to Mathematics curriculum policies are important considerations in their leadership activities and, therefore, important to study. In particular, the study aimed at investigating subject advisors' curriculum leadership role for mathematics improvement in South Africa. Premised on Spillane, Hallett and Diamond's (2003) findings that curriculum leadership is the key to attempting to transform curriculum reform policies in the teaching and learning of Mathematics, the researcher examined subject advisors' perceptions, attitudes, values, beliefs, concerns and understanding of Mathematics reform policies. Although Cuban (1993) and UNESCO (2017) admit that it is not an easy task to change organisational activities and procedures in schools, in particular, subject advisors and educators as curriculum leaders, should seek to change classroom practices to ensure that all learners have access to quality teaching and learning opportunities. Successful implementation of curriculum reform policies depends largely on subject advisors who create conditions supporting educator learning and instructional transformation (Spillane, Diamond & Jita, 2003). The researchers' focus in this study was on instructional leadership, which Spillane *et al.* (2003:4) define as "an influence relationship that motivates, enables and supports educators and subject advisors' efforts to learn about as well as changing their classroom practices".

## **1.5 PERSONAL VALIDATION**

This study was partially informed by the researchers' experience as a principal and HoD who had worked directly with subject advisors, and by research that has been conducted on the work of subject advisors. The researcher applied for the HoD post based on years of teaching experience and qualifications and was aware what was expected of a person in that role by the Employment of Educators Act (EEA) (DoE, 1998), but did not know how to fulfil the expectations of the duties. A number of subject educators in the researchers' department were assigned to act as subject heads, to help with subjects that the researcher had not specialised in at university. However, in reality, they did not do much to assist and, consequently, there were poor learner achievement results. It was then suggested by district officials that subject advisors should come to the school to assist.

Research about the curriculum leadership role of subject advisors in the teaching and learning of mathematics is limited (Little, 1985), especially in the South African context. Bennett *et al.* (2003) claim that most studies focus on primary schools, although the issues raised by the researchers are relevant for both primary and secondary schools. Some South African studies that relate to subject advisors' curriculum leadership role have been conducted at secondary schools (Ali & Botha, 2006; Bambi, 2012; Malinga, 2016; Tatana, 2014). However, little is known about the manner in which subject advisors ought to execute their curriculum leadership role, although the Educator Employment Act (EEA) serves as a guide, especially in South Africa.

The poor learner achievement in Mathematics is evident from studies that report that South African learners perform poorly in standardised international, regional as well as national assessments (RSA, 1995b; RSA, 2011). Among the assessments are the Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ), the Trends in International Mathematics and Science Study (TIMSS), the Annual National Assessment (ANA) and the National Senior Certificate (NSC) (Matric) examinations (Mphahlele, 2014; KZNDBE, 2003). Further research is recommended by Andrews, Gilbert and Martin (2007) to determine whether support is being provided to educators and subject advisors, especially those who are new to the profession of teaching. Zepeda and Kruskamp (2007) recommend more studies be conducted to understand, support and nurture the work of educators and subject advisors. Poopedi (2011) also recommends that subject advisors' curriculum leadership be studied continuously, due to the complexities of management and giving guidance and direction in schools. Sithole (2016), after exploring the curriculum leadership role of mathematics HoDs at secondary schools, recommends that future studies explore the curriculum leadership role of subject advisors for mathematics improvement in South Africa. The poor results achieved in mathematics by learners (DBE, 2015; UNESCO, 2017) in South Africa, as well as the lack of studies providing adequate knowledge about the curriculum leadership role of mathematics subject advisors, prompted this study.

## **1.6 PURPOSE OF THE STUDY**

The researcher focused on the curriculum leadership role of Mathematics subject advisors in the five districts of the Free State province in South Africa. He explored the manner in which mathematics subject advisors provide subject-specific curriculum leadership and the nature of support and resources they obtain from district offices, with a view to understanding the way in which Mathematics subject advisors' curriculum leadership contributes to quality teaching and learning of Mathematics in South African secondary schools. The researcher was also interested in learning how Mathematics subject advisors' curriculum leadership is perceived by Mathematics educators. It is in this vein that Malinga and Jita (2016) argue that improving Mathematics subject advisors' curriculum leadership is one way of increasing and improving opportunities for effective teaching and learning of Mathematics, which, in turn, influences learner achievement in Mathematics.

Over the years, many changes have occurred in the Department of Education. These changes include a change in names as well as job titles. In the 1990s, inspectors were deployed to schools; however, there were problems with inspectors' duties as explained by Tatana (2014). Inspectors were on a fault-finding mission, to the extent that support and guidance were not provided where they were needed (Nkambule & Amsterdam, 2018).

It was only when the curriculum changed that professional development workshops were conducted for educators. After the workshops, educators were left alone to implement what they had learned. Tatana (2014) claims that from 1990 to 1992, he received only one class visit from a subject advisor, and had attended three workshops, one of which was when Outcomes Based Education (OBE) was implemented. As a principal working closely with subject advisors, the researcher noticed that educators did not welcome school visits by subject advisors. During their visits to schools, some subject advisors sat in the principals' office, while some visited educators in their classrooms. It seemed as if subject advisors' curriculum leadership role was not understood by educators, because educators felt uncomfortable about the subject advisors' visits, and would be nervous until the subject advisors left the school, as claimed by Nkambule and Amsterdam (2018).

One of the roles of subject advisors is to support educators in terms of the *Guidelines on the Organisation, Roles and Responsibilities of Education Districts* (DBE, 2011). The attitude many educators displayed about the visits of subject advisors implies that educators did not expect subject advisors to support them in promoting effective teaching and learning of Mathematics. This is further evidenced by the fact that South Africa, as a developing country, does not have adequate research knowledge about subject advisors' curriculum leadership role. Christie (2010), in explaining this shortage, states that South Africa's research base is insufficient to provide advice for subject advisors to fulfil their curriculum leadership role effectively; most research about subject advisors' curriculum leadership role was done in developed countries.

Research on subject advisors' curriculum leadership role is very limited, as reported by Hoadley *et al.* (2009). This shortage is also emphasised by the policy documents that were produced by the Department of Basic Education, namely the *Guidelines on the Organisation, Roles and Responsibilities of Education Districts* (DBE, 2011) and the *Policy on the Organisation, Roles and Responsibilities of Education Districts* (DBE, 2013). These documents confirm the importance that the Department attaches to the functioning of the education districts, and to the closing of the gap between theory and practice in terms of subject advisors' curriculum leadership role in South African secondary schools.

The researcher currently holds the position of principal (at the time of the research, for four years) and was HoD for Mathematics, physical sciences, geography and business studies (for six years), which enabled him to associate with different subject advisors responsible for leading different subjects. Moreover, the researcher is also the current national president of the South African Association of Science and Technology Educators (SAASTE). In this capacity, he is directly involved with the teaching and learning of Mathematics, physical sciences, life sciences, geography, natural sciences, technology, agriculture and social sciences, on a national level. The researcher has developed working relationships with subject advisors and educators (who are the participants in this study), and with School Management Teams (SMTs). The researcher visits district offices regularly to discuss issues pertaining to effective teaching and learning of the subjects that fall under his control and department. His roles as national president of SAASTE (for five years), principal

(for four years) and HoD of mathematics (for six years) mean the issues of curriculum leadership have involved him directly. An exploration of subject advisors' curriculum leadership role would benefit policy makers, district directors, subject advisors, educators and learners, as it will contribute to the existing body of knowledge on subject advisors' curriculum leadership role, which, in turn, will improve learner achievement in Mathematics.

The purpose of this study was to explore the perspectives and perceptions of subject advisors about their curriculum leadership role in the teaching and learning of Mathematics at secondary schools. The ultimate goal was to contribute, through the data collected by the planned survey, to the improvement of the quality of services rendered by Mathematics subject advisors. In exploring subject advisors' curriculum leadership role, the study considered the perspectives subject advisors and educators held about the curriculum leadership role of Mathematics subject advisors.

## **1.7 THE RESEARCH QUESTIONS**

The main research question to be answered was: *How do subject advisors understand their curriculum leadership roles for Mathematics improvement in South Africa?*

In order to understand subject advisors' curriculum leadership role fully, the following sub-questions were formulated:

- What is the policy and/or regulatory framework that guides and/or regulates the functions of subject advisors in curriculum leadership and support in South Africa?
- How do subject advisors, across a variety of contexts in South Africa, understand and go about implementing their roles in curriculum leadership and support for the improvement of Mathematics instruction?
- How can a theoretically sound account be constructed to explain the understandings and implementation practices of Mathematics subject advisors in South Africa?

## **1.8 AIMS AND OBJECTIVES OF THE STUDY**

The aim of the study was to establish the manner in which subject advisors understood their curriculum leadership roles for Mathematics improvement in South Africa. In this study, the following objectives were considered:

- To analyse the policy and/or regulatory framework that guides and/or regulates the functions of subject advisors in curriculum leadership and support in South Africa.
- To explore the manner in which subject advisors, across a variety of contexts in South Africa, understand and go about implementing their roles in curriculum leadership and support for the improvement of Mathematics instruction
- To establish the manner in which a theoretically sound account can be constructed to explain the understandings and implementation practices of Mathematics subject advisors in South Africa.

## **1.9 THEORETICAL FRAMEWORK**

Green (2014) defines a theoretical framework as a theory that a researcher chooses to guide him/her in his/her research. Imenda (2014:189) claims that, “a theoretical framework is the application of a theory or a set of concepts drawn from one and the same theory, to offer an explanation of an event, or shed some light on a particular phenomenon or research problem”.

The study was informed and framed by literature on Mathematics teaching, and it utilised the cognitive framework outlined by Spillane (2010). Previous research scrutinised subject advisors’ role in making sense during the implementation of curriculum leadership, but ignored the fact that the sense-making subject advisors built from Mathematics policies are pivotal for effective curriculum leadership (Cohen, Manion & Morrison, 2011; Spillane, 2000). Implementing includes assigning meaning; therefore, subject advisors must determine the meaning of policy, and this helps them to decide whether to adapt, ignore or adopt recommendations of policy makers in their practice. The current study also used the background of the York-Barr and Duke’s (2004) educator leadership model to study the associations of six

components, namely management and administration, subject advisors' personal attributes, leadership work, school conditions, feedback and evaluation of effectiveness as well as intermediary outcomes of leadership work, as proposed by York-Barr and Duke (2004). Thirdly, Angelle and DeHart's (2011) model of educator leadership was also used to capture the essence of curriculum leadership role of subject advisors in the development or improvement of Mathematics teaching and learning in South African secondary schools.

### **1.10 CONCEPTUAL FRAMEWORK**

A conceptual framework may be defined as “an end result of bringing together a number of related concepts to explain or predict a given event, or give a broader understanding of the phenomenon of interest or simply of a research problem” (Imenda, 2014:189). Tashakkori and Teddlie (2012) claim that the process of arriving at a conceptual framework is akin to an inductive process whereby small individual pieces (concepts) are joined together to develop a larger map of possible relationships. A conceptual framework is thus derived from concepts, just as a theoretical framework is derived from a theory.

The conceptual framework for this study comprises two parts. The first part deals with the four issues that impact directly on the curriculum leadership role of subject advisors, which are poor learner achievement results in Mathematics, basic skills and competence of subject advisors, the professional preparation of subject advisors and the key roles of subject advisors. The issues are considered as the major challenges in the conceptual framework because they form the basis of the entire study, and they prompted an exploration of the curriculum leadership role of subject advisors.

The second part of the conceptual framework provides an overview of some ways in which the subject advisors' curriculum leadership role may respond to the challenges faced by subject advisors in executing their curriculum leadership role. Literature suggests four variables for this, namely defining and communicating shared vision and goals, monitoring and providing feedback on the process of teaching and learning, promoting frequent and appropriate school educator professional development activities and opportunities as well as curriculum management and instruction. These variables are referred to as secondary challenges because there

is actually no compatibility between them and the curriculum leadership role of subject advisors, even though their purpose is to improve learner achievement results in Mathematics.

## **1.11 RESEARCH METHODOLOGY**

Many definitions of research exist. According to De Vos (2006:41), research is a “systematic, controlled, empirical, and critical investigation of natural/social phenomena, guided by theory and hypotheses about the presumed relations”. Accordingly, in research, subjective beliefs are “checked against objective reality” (Maree, 2007:36). Maxwell (2005) defines research design as a plan for conducting a research study. Cohen, Manion & Morrison (2007) describe methods as those techniques and procedures used by the researcher to gather data, and methodology as being about describing the approaches to research.

### **1.11.1 Paradigms in Research**

A paradigm is “a set of beliefs that guide action” (Denzin & Lincoln, 2003:244). There are four paradigms in research, namely positivism, post-positivism, constructivism-interpretivism and critical-ideological (Ponterrotto, 2005). Each paradigm has an ontology, epistemology and methodology. The study followed an interpretivism paradigm, which is suitable for this study because of its assumption that we can only understand human life from the inside (Plowright, 2011). The focus was on human experiences, the way people build and share meaning, and their interrelationships and interactions. In studying curriculum leadership, research techniques were used to help understand how subject advisors interpret Mathematics curriculum policies, and how they interact within their social environments in their practice of leadership for Mathematics at schools. The study was to understand the curriculum leadership role of Mathematics subject advisors and the implications for the teaching and learning of Mathematics in South African secondary schools (Yin, 2003).

### **1.11.2 Research Approach**

Essentially, the research is qualitative in nature. A qualitative approach is suitable for studies where the researcher wants to gain an understanding of a particular phenomenon (Creswell, 2013). Denzin and Lincoln (2005:3) claim that “qualitative research is a situated activity whereby researchers study things in their natural

settings, in an attempt to make sense of or interpret phenomena in terms of the meanings people bring to them". In this study, the researcher intended to obtain information about the experiences, perceptions, beliefs, roles and practices of a group of seven subject advisors and ten educators. He explored, reflected on and described the way Mathematics subject advisors in the five districts of the Free State province, as curriculum leaders, made sense of Mathematics curriculum reform policies and the implications thereof for the teaching and learning of Mathematics. The researcher specifically sought to understand how their interpretation and understanding of curriculum reform policies influenced their curriculum leadership, if at all.

Creswell (2013:64) suggests that a qualitative research inquiry is characterised by:

*[researchers collecting] data in face-to-face situations by interacting with selected individuals in their settings and in which the researcher describes and analyses peoples' individual and collective social actions, beliefs, thoughts and perceptions.*

Hence, the face-to-face meetings with seven Mathematics subject advisors and ten educators to explore their practices, perspectives, actions, beliefs, experiences, roles and thoughts aligned directly with a qualitative approach. In order to obtain an in-depth understanding of subject advisors' curriculum leadership role in secondary schools and the sense that they construct regarding Mathematics reform policies, he opted for a qualitative rather than a quantitative approach (Yin, 2003).

### **1.11.3 Research Design**

Research design refers "to the entire process of research based on certain design principles" (Creswell, 2013:32). In order to examine and explore subject advisors' curriculum leadership role and to develop a theory around it, the generic qualitative research design was utilised. Denzin and Lincoln (2005:3) claim that, "in a qualitative study, researchers study things in their natural settings, in an attempt to make sense of or to interpret the phenomena in terms of the meanings people bring to them". Utilising this qualitative design, the researcher developed theories generated from the collected data by applying the following steps, as suggested by Silverman (2005:179):

- Creating categories classifying the data;
- Saturating the categories with relevant, appropriate cases; and
- Developing the categories into more general analytical frameworks with relevance outside the setting.

This qualitative study employed a case study design. In this case, the aim was to understand the curriculum leadership role of Mathematics subject advisors in enhancing effective teaching and learning of Mathematics. A case study provided the researcher with an opportunity of studying real people in their natural settings and afforded an opportunity to understand ideas better, as suggested by Cohen *et al.* (2007), who further point out that a case study establishes cause and effect.

The researcher opted to use a case study design in order to obtain details about the how and why of the less studied phenomenon of subject-specific curriculum leadership for Mathematics in secondary schools. The availability of only a small number of subject advisors and educators enabled in-depth and detailed examination of each of the seventeen cases as they related to the teaching and learning of Mathematics.

#### **1.11.4 Population and Sampling**

Population refers to all elements that meet certain criteria for inclusion in a study (Creswell, 2012). Angell and Townsend (2011) advise researchers to cluster the research population geographically; thus, Mathematics subject advisors were selected from five districts in the Free State province from a population of twenty-one subject advisors. Ten educators from ten different secondary schools in the Free State province, consisting of 329 secondary schools and 987 mathematics educators, participated. Bless and Higson-Smith (2004:84) defines a sample as “the whole subset of the population investigated by the researcher and whose characteristics are generalised to the entire population”. Williman (2001:232) describes a sample as “a subset of a large population, which provides a fair representation and from which information is gathered and selected for research purposes”.

In this qualitative study, purposive sampling was considered the most appropriate because it enabled the researcher to generalise subjectively according to personal experience (De Vos, 2006:329; Maree, 2007: 79). Leedy and Ormrod (2001:215)

and Moore (2009:15) agree that purposive sampling “means that participants are selected because of some defining characteristics which make them the holders of the data needed for the research”. In this study, the focus was on exploring subject advisors’ curriculum leadership role in secondary schools and the implications this could have for the teaching and learning of Mathematics. Therefore, the research sample consisted of seven Mathematics subject advisors from five different districts and ten educators from ten different schools in the Free State province.

To gain an in-depth understanding of the curriculum leadership role of subject advisors, the researcher needed to involve participants who are experienced in this field. Purposive sampling was appropriate for that study, as it is used when a researcher chooses individuals to be included in the sample based on characteristics they possess and which the researcher is investigating (Cohen *et al.*, 2007). Purposive sampling was employed to choose the seven Mathematics subject advisors and 10 educators.

#### **1.11.5 Data Generation**

Data were generated through semi-structured interviews, observations and document analysis. Interviews are useful in research as they enable the participants to express their understanding of their situations in their own way (Cohen *et al.*, 2007). Semi-structured interviews were used as they enabled the researchers to obtain rich data by asking both searching and follow-up questions to obtain clarity on a particular response (Silverman, 2005). The researcher used a voice recorder to record all the interviews which gave access to the exact words of the interview, which assisted in the verbatim transcriptions and analysis of the data, A digital recorder was used, as it has a lengthy recording time and voice recordings were transferred easily to a computer, which facilitated the transcription process (Roulston, 2010). Observations were done during educator training workshops conducted by subject advisors as well as during classroom visitations to capture the nature of support given to Mathematics educators by subject advisors and the manner this support influenced educator classroom practices. Document analysis was conducted on specific documents to further augment and support the findings from the interviews and observations.

### **1.11.6 Data Analysis**

The researcher used eight steps in data analysis, as proposed by Tesch (1990). In the first place, the researcher carefully read through all the transcriptions, making notes of ideas that came to mind. This was followed by the selection of one interview and reading methodically to elicit meaning in the information, as well as writing down thoughts and ideas that come to mind. The researcher went through the transcripts, arranging similar topics in groups by forming columns labelled with major topics, unique topics and leftovers as advised by Shields and Twycross (2008) as well as Lincoln (2005). In addition, the researcher abbreviated the topics as codes and wrote the codes next to the appropriate segment of the text as well as observing the organisation of data to check if new codes or categories emerged. Apart from this, the researcher found the most descriptive wording for the topics and converted these into categories in order to reduce the total list of categories by grouping topics together that linked (related) to each other and lines were drawn between the categories indicating interconnection of categories (De Vos, 2002). A final decision was then made on the abbreviations of each category and the codes were arranged in alphabetical order. The data materials belonging to each category were put together in one place and preliminary analysis performed.

### **1.12 SIGNIFICANCE OF THE STUDY**

Research has been conducted on exploring the different role principals, HoDs and educators play in promoting effective teaching and learning (Ng, Nguyen, Wong & Choy, 2015). However, very few studies have addressed the curriculum leadership role of Mathematics subject advisors. Knowledge of how Mathematics subject advisors' curriculum leadership role is constructed remains brief. The significance of this study lies in the fact that it explored Mathematics subject advisors' curriculum leadership role in relation to educator support and development for improving learner achievement results in Mathematics. It is through an understanding based on empirical evidence that the influence of subject advisors' curriculum leadership role can be improved and evaluated. It is not ideal for the government to continue channelling resources for educator professional development and school visits by subject advisors without assessing value for money as measured by improved educator classroom practices and by learner achievement results. Therefore, data

from this study provides part of the information base that can be used in the debates concerning the curriculum leadership role of subject advisors in terms of the nature of support and guidance that they give to educators. Findings from this study may also assist in the development of a standardised model, which can be used to inform leadership training of Mathematics subject advisors wishing to improve subject advisors' curriculum leadership role, which influences educators' classroom and teaching practices as well as learners' performance. The significance of having subject advisors and educators participating was to gather as many views as possible with regard to the curriculum leadership role of Mathematics subject advisors and the impact it could have on Mathematics teaching and learning.

The current study could be important at the systemic level, where recommendations are made regarding Mathematics subject advisors' curriculum leadership role, and where Mathematics subject advisors' curriculum leadership is explained, and proposals made for the way leadership could be provided in secondary schools. The knowledge that emerges from this research has the potential to improve the curriculum leadership role of subject advisors. With an improvement of the curriculum leadership role of subject advisors, educators' classroom practices could also improve, with the hope of improving learner achievement results in Mathematics. The government will benefit by realising value for resources spent on educator professional development programmes and school visits by subject advisors. Universities and colleges will have an increase in the number of students pursuing careers in Mathematics, and, ultimately, the economy will grow (Hallinger & Heck, 2011).

### **1.13 LIMITATIONS OF THE STUDY**

Limitations in the availability of funds for research influenced the researcher's sampling. The researcher used purposive sampling, focusing on those participants who were likely to provide reliable and relevant information (Yin, 2003), and in order to mitigate financial limitations. However, the researcher could not override issues of timing as the schedules or action plans of subject advisors and educators had not been determined fully at the commencement of the study and, due to circumstances beyond the researcher's control, were liable to change at any time. The pre-planned meetings with educators and subject advisors sometimes clashed with other

activities and workshops, necessitating rescheduling or adjustment. For instance, three interviews with subject advisors and workshop observations with five subject advisors were postponed due to sudden provincial meetings by the Member of Executive Council (MEC) of Education (Dr Tate Makgoe) in the Free State province. The researcher liaised in advance with participants, created a time line and schedule accordingly in order to mitigate the impact of time. The researcher endeavoured to adhere stringently to set schedules and time lines of the study, such as submission after finishing every chapter to the supervisor for constructive feedback as well as being on time for the scheduled interviews with both the subject advisors and educators in order to mitigate the limitation of time.

Lastly, although the study was a case study whose purpose was not to generalise, the fact that it was conducted on only seven subject advisors and ten educators across five districts in the Free State province may have limitations when it comes to contextual richness. In depth interviews, nevertheless, generated useful data that can be used as a springboard for future studies in different contextual settings.

#### **1.14 DELIMITATION OF THE STUDY**

The study is delimited geographically. The study was confined to five districts situated in the Free State province of South Africa. A longitudinal study would have provided a more adequate representation of the impact of subject advisors' curriculum leadership role on improving and shaping educators' classroom practices. With the limitation of time, a cross-sectional study was however preferred. This study was conducted in 2018 and it was within this period that the study results were analysed and presented. Reference is made to Grade 12 examination results of the ten secondary schools, situated in five districts. The positive impact of the curriculum leadership role of subject advisors was judged not by other indicators but by learner achievement results in Mathematics.

The scope of this study is limited to seven subject advisors and 10 educators in the Free State province of South Africa. Mathematics subject advisors and educators in primary schools were excluded from this study. The study focused on secondary schools in the Free State province because they were closer to the researcher, who was residing in Xhariep district of the Free State province when the study was conducted. Thirdly, this study did not focus on specific mathematics topics, but on

the way in which Mathematics subject advisors lead and guide the implementation of the curriculum, with the intention of improving effective teaching and learning of Mathematics, which, in turn, influences learner achievement results in Mathematics. Furthermore, the current study only focused on Mathematics subject advisors' curriculum leadership, even though the researcher acknowledges that teamwork among curriculum leaders (principals, deputy principals, HoDs, subject advisors and educators) is essential for their practice of curriculum leadership. This cooperation needs to be scrutinised by studies in the future.

### 1.15 DEFINITION OF KEY CONCEPTS

Several core concepts were used throughout this research project and are defined in this section. Dossey (1992) views Mathematics as a deductive theory, starting with primary axioms and notions. It is a subject that deals with ideas, as opposed to chalk marks or pencil marks, physical triangles or physical sets; it deals with ideas which may be represented by physical objects.

In this study, **Mathematics** is defined as:

*A language that makes use of symbols and notations for describing numerical, geometric and graphical relationships. It is a human activity that involves observing, representing and investigating patterns and qualitative relationships in physical and social phenomena and between mathematical objects themselves. It helps to develop mental processes that enhance logical and critical thinking, accuracy and problem solving that will contribute to decision making (DBE, 2012:11).*

According to Flinders and Thornton (2004:11), **curriculum** refers to:

*(1) the entire range of experiences, both undirected and directed, concerned with unfolding the abilities of the individual, or (2) the series of consciously directed training experiences that a school uses for completing and perfecting the enfoldment.*

As defined by Moore (2009:33), "It is the planned and unplanned learning experiences that learners undergo while in a school setting". On the other hand, Armstrong (2003:4) views curriculum as "decision making processes and products

that focus on preparation and assessment of plans designed to influence learners' development of insights related to specific knowledge and skills".

As applied in this study, **curriculum** refers to:

*what a learner is supposed to encounter, study, practice and master. It entails taking decisions about what should be taught, how it should be taught and when it should be taught. It is also "the series of things that learners must do and experience in the process of developing abilities for adult life" (DBE, 2013:7).*

**Leadership** "focuses mainly on the attempt to influence others so as to achieve favourable outcomes. **Curriculum leadership** encompasses directing such influence towards curriculum decisions for better learning objectives" (Jita & Mokhele, 2013:S124). Harris *et al.* (2003:2) view **curriculum leaders** as "those people who are able to build collaborative cultures through generating positive relationships". Furthermore, **curriculum leaders** build the capacity for improvement through working collaboratively and through building professional learning communities within schools. In this study, they are viewed as leaders who provide direction, guidance and support to both educators and learners, with the aim of improving teaching and learning (Kruger, 2003:206).

**Role** is defined by Mphahlele (2014) as a function that any individual or institution can play in society so as to fulfil the goals of that particular society. For the purpose of this study, role is regarded as the duty of subject advisors, which is what is expected of them with regard to giving guidance and direction to educators.

According to De Grauwe and Carron (2007), **support** refers to the advice given to educators by their supervisors, and it entails other characteristics such as lesson demonstration, individual tutoring and organisation of peer learning as well as in-depth service trainings that are planned and implemented by district officials locally. In this study, **support** refers to *the curriculum guidance and direction given to educators by subject advisors with the intention of improving learner achievement results in Mathematics.*

**Practices** are defined as “the total programmes, strategies and activities that leaders use to influence instruction” (Jones, 2010:39). For the purpose of this study, practices refer to instructional practices.

Moore (2009:5) considers **teaching** as including “the actions of someone who is trying to assist others to reach their fullest potential in all aspects of development”. This study draws directly from the position of Tobias and Duffy (2009:224), for whom “teaching is a process whereby learners acquire knowledge and skills in school settings”.

**Subject advisors** are also referred to as middle managers, subject leaders and curriculum coordinators (Kirkham, 2005:160). I use the term *subject advisors* to refer to district-based educators who have been formally appointed to provide leadership in the curriculum, and exclude senior educators who are involved actively in developing and implementing Mathematics curriculum policies at the school level. “Subject advisors are district-based staff (educators), who have insight into designated areas of curriculum or aspects of the work of a school, such as educator professional development and support, learner assessment as well as discipline” (Armstrong, 2003:9). Subject advisors fall between district management and the school management, the “knot and bridge of knowledge creation” (Sallis & Jones, 2002:409-410). This study draws on the definition of subject advisors given by the International Reading Association (2004), as subject experts and specialists, actively engaged in the facilitation and provision of educators’ professional growth, which is essential for implementing curriculum and leadership in schools (Neumerski, 2012).

**Supervision** is an interpersonal process in which the skilled district official, overseer or supervisor assists the less skilled in relation to their personal as well as professional development (Carrol, 1996; Fowler, 1999; Holloway, 1995). As applied in this study, supervision is viewed as a process of interaction between the educator and subject advisor, in which the subject advisor assists educators in their personal and professional development, with the sole purpose of improving learner achievement results in Mathematics.

The term **educator** refers to any individual employed under the EEA, and who is also teaching and/or providing professional services in a public school (DoE, 1998:3). As used in this study, educator refers to subject teachers and HoDs.

**Instructional leadership** is viewed by Sharma (2012) as leadership for developing educators and learners holistically. Pansiri (2008) claims that instructional leadership enables management, educators and learners to work together with the aim of improving learner achievement in Mathematics. In light of the above, instructional leadership, as applied in this study, is viewed as giving guidance and direction, and focusing on improving learner achievement results through evaluating, monitoring, controlling and supporting educators' work, thereby promoting effective teaching and learning of Mathematics.

Argia and Ismail (2013) describe **transformational leadership** as motivating employees to work at a higher level and to focus on the organisational rather than individual interest. In this study, **transformational leadership** relates to enhancing the performance of educators (followers), with the aim of improving learners' (the organisations') performance through motivating educators (followers), as viewed by (Shadraconis, 2013).

**Communication** is viewed as an exchange of information between sender and receiver as well as understanding in meaning between individuals involved (Waldron and McLeskey, 2010). For this study, communication refers to subject advisors as senders of information to educators, who are the recipients.

Geier, Smith and Tornow (2012) define **implementation** as doing things in a new way or putting innovation into practice. Change execution may require alternative or new processes, knowledge, skills, materials and expected duties. According to Weisenmiller (2008), **implementation**, in a broader sense, is the process through which a proposed theory, concept, model or topic is taken up by practitioners. In this study, it refers to actions or strategies that educators must follow in teaching Mathematics, and these are the suggestions or recommendations that have been made by subject advisors in specific schools.

## **1.16 CHAPTER OUTLINE**

The study consists of five chapters as follows:

**Chapter 1** is the introduction and background that provided an orientation to the study. Readers were introduced to the nature of study, the background to the study and the rationale for curriculum leadership. The researcher provided one major

research question and three secondary questions and gave a brief overview of the methodology used in the study. The chapter also explored the limitations and delimitations of the study and presented definitions of the key concepts used in this research.

**Chapter 2** presents the theoretical and conceptual frameworks of the study, literature review, a discussion of curriculum leadership literature, which is used to develop and organise arguments, pointing to the theoretical framework and conceptual lens of the study. The literature that is reviewed relates to subject advisors' curriculum leadership role, the key roles of subject advisors, the interactions of subject advisors with heads of schools, HoDs and educators, context, teaching and learning. The researcher summarised findings from existing literature in relation to curriculum leadership. He also applied the cognitive theory, York-Barr and Duke's (2004) as well as Angelle and DeHart's (2011) models to understand subject advisors' curriculum leadership role. This is followed by a discussion on the conceptual framework of the study. The researcher illustrated the connections of subject advisors' curriculum leadership interactions and the way the cognitive theory (York-Barr & Duke, 2004; Angelle & DeHart, 2011) is used as the theoretical framework for the arguments put forward.

**Chapter 3** presents the research design and methodology. In this chapter, the researcher outlined the manner in which the empirical part of the study of subject advisors' curriculum leadership was conducted. He starts by describing the research design and methodology used, presenting arguments pointing to the constructivist position of the study. The researcher outlines the research strategy as a qualitative case study involving seven Mathematics subject advisors and ten educators, in which narrative research is used. The chapter discusses the process of data collection, analysis and interpretation in detail, ensuring that the processes are theoretically grounded. The way the researcher conducted a pilot study to perfect the instrument utilised in the data collection process is also described.

**Chapter 4** consists of the findings of the study, and contains extensive and detailed descriptions of the research findings and the researcher's experiences during the data collection process. Some of the extensive and detailed descriptions include the participants' original extracts, in order to present strong narratives of the findings.

The research findings are organised into three broad emerging themes, each with several sub-themes and categories, Figures and tables are used to summarise the sub-themes and categories under each theme. Since this is qualitative research, the presentation of the research findings enables readers to embark on an exploration of personal experiences through the study, as they are immersed in the thick and rich descriptions of curriculum leadership role of subject advisors.

**Chapter 5** contains the analysis and discussion of findings, and presents the researcher's voice. He presents arguments based on the findings of the study by comparing and contrasting them with findings reported in the literature reviewed in Chapter 2. The researcher discusses the way the findings of the study echo the existing literature or differ from the findings made elsewhere in literature and the manner in which the current findings may be silent about certain issues in the literature. He illustrates how the findings speak to the cognitive theory, York-Barr and Duke's (2004) as well as Angelle and DeHart's (2011) theoretical framework and conceptual frameworks of the study. The researcher's discussion in this chapter engages the readers on the contribution of the study to filling part of the gap identified during the conception of the study's research questions. Chapter 5 also contains recommendations and conclusions of the findings, which summarise findings relating to subject advisors' curriculum leadership role. The chapter concludes with recommendations for further research into Mathematics subject advisor's curriculum leadership role.

## **1.17 CHAPTER SUMMARY**

This chapter is the introduction and background of the study, and provided an orientation to the study. It presented the nature of the study, background to the study as well as the rationale for exploring the curriculum leadership role of Mathematics subject advisors. The researcher provided one major research question and three secondary questions and provided a short overview of the methodology used in the study. He concluded by exploring the limitations and delimitations of the study, definitions of key concepts used in the study as well as the chapter outline for the study. The next chapter presents the theoretical and conceptual frameworks of the study.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 INTRODUCTION**

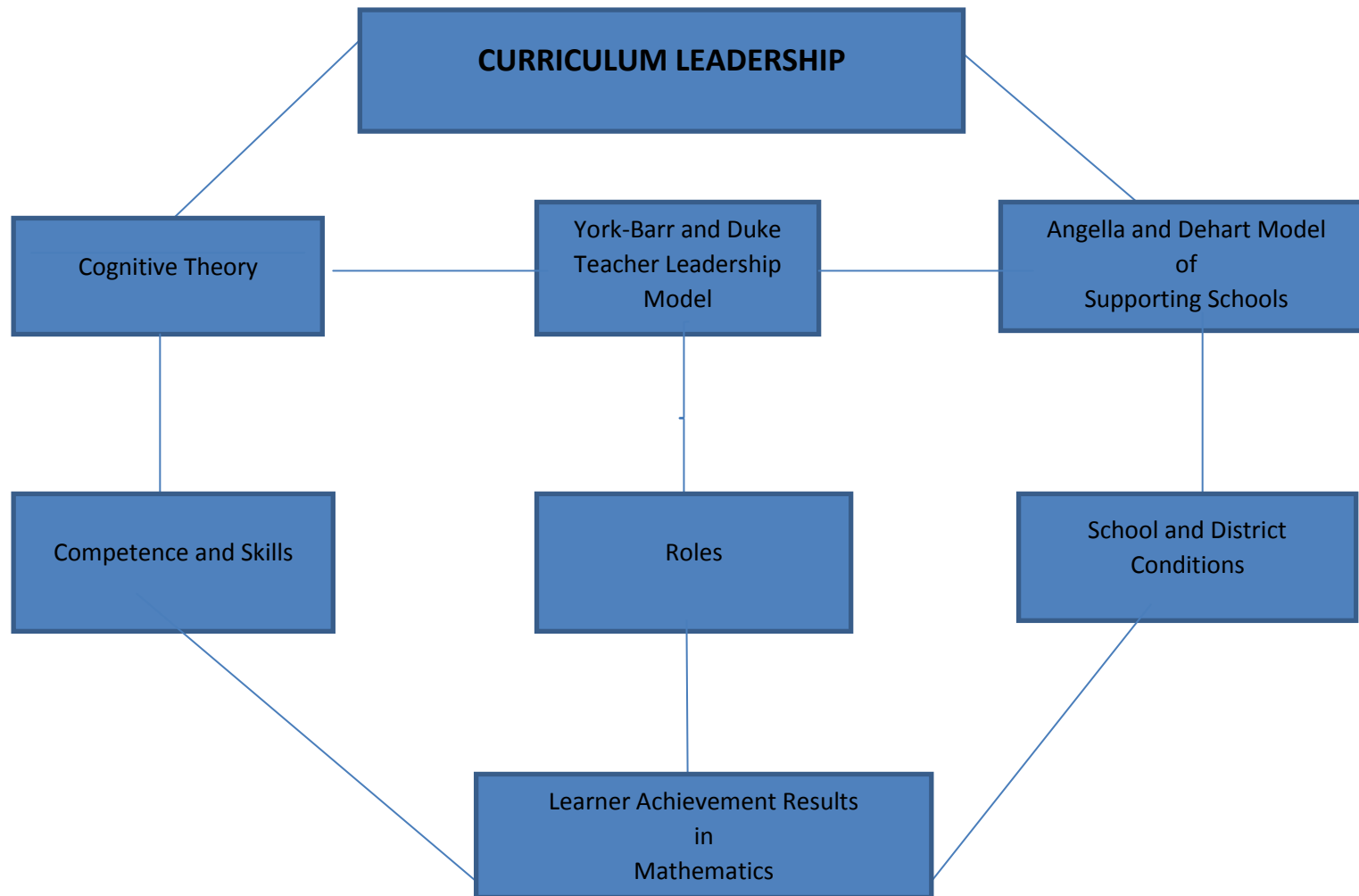
A number of scholars globally have investigated the curriculum leadership role of subject advisors in general, especially at the primary school level (Verger, Altinyelken & Koning, 2013; Atteberry, Bryk, Walker & Biancarosa, 2008; Deussen, Coskie, Robinson & Autio, 2007). The curriculum leadership role of subject advisors has been accepted widely as a reform strategy of improving educator classroom practices, which in turn, influences learner achievement results (Jones, 2009). There is however, growing contestation and controversy regarding the manner in which subject advisors' curriculum leadership role should be constituted, their practices, structures as well as the kinds of support they need to execute their responsibilities effectively. Both Jita and Mokhele (2012) and Delpont and Makaye (2009) concur that curriculum leadership in South Africa and other developing countries is conceived in terms of building capacities for educator professionals and other stakeholders of the school. Others like Jones and Harris (2010), McMillan and Schumacher (2010) view subject advisors' curriculum leadership as agents for resource mobilisation, boundary spanning as well as vehicles for supporting educators and schools. This chapter discusses previous studies on the curriculum leadership role of subject advisors as well as literature on curriculum leadership and instructional leadership. The theoretical framework and conceptual framework informing the study are also discussed and justified, followed by a review of international and national literature to support the arguments.

Plowright (2011) maintains that there are different views as to when a literature study should be conducted in a qualitative study. Researchers claiming that literature review should be done before collecting data to motivate their view by stating that prior literature review justifies the study, puts the study into context as well as acquainting the researcher with the phenomenon under exploration. Other researchers are of the opinion that the literature review should be done after collecting the data in order to avoid the researcher from being influenced by prior thoughts on the topic being investigated, as advocated by Willis (2007).

In this study of the exploration of Mathematics subject advisors' curriculum leadership role, the researcher submitted a research proposal prior to submitting a literature review since this was a prerequisite for the commencement of the research project. The reason was that the researcher intended to obtain more background knowledge about the curriculum leadership role of Mathematics subject advisors in the Free State province of South Africa. Thereafter, a more detailed literature review was undertaken in order to orientate the researcher with experiences, perceptions, understanding, ideas, concerns, values and beliefs of Mathematics subject advisors as leaders of the curriculum. This information (data) was used to construct as well as adapt the conceptual phase and to formulate the criteria for the study.

## **2.2 THE THEORETICAL FRAMEWORK**

The study used cognitive theory, the York-Barr and Duke educator leadership model and the Angella and DeHart model of supporting schools to capture the essence of subject advisors' curriculum leadership role as it is practised in South African secondary schools. Figure 2.1 below gives a summary of the theoretical framework lens used in the study as well as the discussions and justifications.



**Figure 2.1: Diagrammatic representation of the theoretical framework used in the study**

The following section discusses the three positions underpinning this study of subject advisors' curriculum leadership role, namely cognitive theory, York-Barr and Duke (2004) educator leadership model, as well as the Angella and DeHart model (2011) of curriculum leadership.

### **2.2.1 Curriculum Leadership Theory**

Tan (2012) views curriculum leadership as leaders whose goals are academically oriented, having the ability to supervise and to work with educators in order to improve learner achievement results in Mathematics. This view of curriculum leadership concurs with that of Southworth (2002) who defines curriculum leadership as being about teaching and learning, the improvement of learner achievement results as well as educator professional development. It is expected that a person who practises curriculum leadership should have a high knowledge and understanding of curricula as well as learning, as advocated by Day, Harris, Hadfield, Tokey and Beresford (2000) and Yamasaki (2016). Certain authors define curriculum leadership based on a broad definition or on a narrow definition of curriculum leadership that concurs with the views of Deventer and Kruger (2003) as well as Southworth (2002). A broad definition of curriculum leadership, according to Southworth (2002), relates to those aspects of leadership having to do with the organisation and the culture of educators whilst the narrow definition focuses on supervision of teaching, learning and educator professional development, as articulated by van Deventer and Kruger (2003).

Subject advisors are given different titles in different countries. For example, they are called subject specialists and administrators in the USA, and middle managers, subject leaders and curriculum coordinators in the UK. In Nigeria, they are called quality assurance inspectors and in Botswana, they are called field officers. For this study, I use the term subject advisor as it is used in the South African context, except where a different term was used in the literature.

#### **2.2.1.1 Reflections on the curriculum leadership role of Mathematics subject advisors**

A variety of leadership definitions exist because leadership involves complex interactions among the leader, the followers and the context. Blackmore (1989) views leadership as a process of defining as well as communicating a clear mission,

goals and objectives with members of staff. Furthermore, Hallinger and Heck (2011) argue that leadership includes managing the curriculum and instruction, supporting and supervising educators as well as monitoring learners' progress, as leadership is informed by learners' achievement results. According to Hoerr (2005:7), "leadership is about relationships" while Leithwood and Riehl (2003) define leadership as a process of giving direction and exercising influence. Yukl (2006) views leadership as a process of persuading followers to work towards a common goal.

Some researchers define leadership in terms of personality and physical traits while others believe leadership is represented by a set of prescribed behaviours. Other researchers define leadership in terms of the power relationship between leaders, followers and the contextual setting (Kreitner & Kinicki, 2010). According to this perspective, leaders use their power to influence followers' behaviour. Leadership can also be an instrument of goal achievement, in other words, leaders are individuals who assist others in accomplishing their goals. Others still, view leadership from a skills perspective.

There are four commonalities among the many definitions of leadership. Firstly, leadership is a process between a leader and followers. Secondly, leadership involves social influence. Thirdly, leadership occurs at multiple levels in an organisation, including at the individual level; for example, leadership involves mentoring, coaching, inspiring and motivating. Leaders also build teams, generate cohesion and resolve conflicts at the group level (Wenger, McDermott & Snyder, 2002). In addition, leaders build culture and generate change at the organisational level. Fourthly, leadership focuses on goal accomplishment. Leadership is defined as a process whereby an individual influences a group of individuals to achieve a common goal (Kreitner & Kinicki, 2010). To assume that all good leaders are good people is to be wilfully blind to the reality of the human condition and this assumption severely limits our scope for becoming more effective at curriculum leadership. The point is that good curriculum leaders develop a keen sense of their strengths and weaknesses and build on their positive attributes. Moreover, research on leadership has only recently started to recognise that the expectations, attitudes and behaviour of followers also affect how well the presumed leader can lead (Hall & Hord, 2006).

### **2.2.1.2 Theories of curriculum leadership**

According to Immegart (1988), many theories on giving guidance and direction reflect the complexity and multidimensional nature of curriculum leadership. These theories refer to, among other types of leadership, transformational leadership, which incorporates an element of teamwork, vision building and vision sharing within the department Johnson (2008). Both Hodgkinson (1991) and Hofstee (2006) explore moral leadership, where the subject advisor could superimpose, to some extent, the ideas of paramount importance to him/her in curriculum delivery. Political leadership incorporates ideas relating to forcing people to obey and influencing and managing conflicts in departments (Hoyle, 1986). Cultural leadership has been the focal point of many researchers, including Schein (1992), who describes the subject advisor's approach to the teaching and learning process. An example of this is a Mathematics subject advisor strongly advocating a hands-on approach to the teaching and learning of Mathematics. Lastly, symbolic leadership is characterised by a subject advisor acting as a role model for educators under his/her control and other, less experienced, educators in the department (Bush, 2008:12). In a review of curriculum leadership and subject advisors' behaviour, Immegart (1988) found that effective subject advisors demonstrate curriculum leadership connected to situations, contexts and tasks (Turner & Bolam, 1998).

Hersey, Blanchard and Johnson (1996) and Yukl (1994) discuss situational leadership in some detail. According to Yukl (1994), situational leadership places considerable emphasis on contextual factors; for instance, type of job carried out in subject department, type of external environment and the characteristics of educators or followers. Hersey *et al.* (1996) explain the role educators play in explaining situational guidance and direction. Educators play an important role, as they determine whatever power the subject advisor has, and they can accept or reject the subject advisors' suggestions as a group.

The style of leadership that the subject advisor adopts will relate to the circumstances pertaining to the subject advisors and the educators within their situations and contexts. Hersey *et al.* (1996) identify several connected concepts, among which readiness is connected to willingness. Their argument is that willingness and ability are associated and are not discrete concepts. They claim that

if educators are willing to accomplish a specific task, they apply their abilities more effectively. This means that in a curriculum leadership context, departmental educators are almost inevitably at different stages of willingness to try out new strategies of classroom teaching or teaching new topics (Leithwood, Seashore-Louis, Anderson & Wahlstrom, 2004). Hence, subject advisors may find themselves leading different educators (followers) and interacting with educators in different ways. Both Bennett (1995) and Leithwood and Riehl (2005) point out that strong curriculum leadership and weak followership may lead to the educators' uncritical acceptance of the subject advisors' interpretation of curriculum reform policies. A better situation would involve the subject advisor's ideas being scrutinised and debated critically, leading to negotiation but eventually the interpretation of what the subject advisor needs will be much stronger (Turner & Bolam, 1998).

As discussed above, different kinds of leadership styles exist, and the types of leadership closely associated with subject advisors' curriculum leadership role are distributed leadership and instructional leadership. However, this study only focuses on instructional leadership.

### **2.2.1.3 Instructional leadership and curriculum leadership**

Instructional leadership concerns teaching and learning as well as the behaviour of educators as they work with learners (Bush & Glover, 2002). The authors further argue that where instructional leadership is employed, the focus of the leader's influence is on learner learning through educators. According to DiPaolo and Tschannen-Moran (2003), instructional leadership emerged to define the roles and duties of school principals. The authors further highlight that instructional leadership was intended to address educator needs as well as improving learner achievement results. Bush (2008) and Robinson (2006) agree that instructional leadership concerns leading and managing teaching and learning, as these are the basic functions of schools.

The terms instructional leadership and curriculum leadership are used interchangeably in the available literature, presumably because they are connected to giving guidance and direction to teaching and learning. In this study, I used curriculum leadership throughout as it involves ensuring quality teaching and learner learning (Bak, 2010). Curriculum leadership assists subject advisors in knowing

whether educators understand the subject content knowledge in order to make informed decisions related to developing and supporting educators. Hallinger and Heck (2011) posit that curriculum leadership is connected to instructional supervision, in the sense that both are done to ensure educators provide quality education to learners.

### **2.2.2 Cognitive Theory**

This study is informed and framed by literature on Mathematics teaching and utilises the cognitive framework outlined by Spillane (2000). Previous research scrutinised subject advisors' role in making sense during the implementation of curriculum leadership, ignoring the fact that the sense-making that subject advisors build from Mathematics policies are pivotal for effective curriculum leadership (Spillane, 2000; Cohen *et al.*, 2011). Implementation includes assigning meaning which means that subject advisors must determine the meaning of the policy as this helps decide whether to adapt, ignore or adopt recommendations in their practice.

An important parameter of implementation centres on ways that subject advisors transform their ideas in response to Mathematics curriculum policies, which in turn influences educators' classroom practices. A cognitive framework adds knowledge and promotes an understanding of subject advisors' curriculum leadership role. Conventionally, policy often serves as a stimulus for subject advisors to change their behaviour and they react by implementing, ignoring or sabotaging the policy (Hutchings, 1995). The way Mathematics curriculum policy is communicated means it is a directive, a given. Forces that influence curriculum leadership include ambiguity, inconsistency, a lack of clarity and insufficient authority of policies. These forces increase the demands made on the subject advisors' own judgement regarding curriculum leadership and policy implementation (Porter *et al.*, 1988).

According to Berman and McLaughlin (1977), factors that are influential in curriculum leadership include implementing agency, attitudes of the community, attitudes of educators and availability of resources and time. According to literature, curriculum policies that fit local motives are welcomed and those that do not, face opposition and modification (Firestone, 1998). Uncertainty concerning the objectives and ways of achieving these objectives, together with a lack of monitoring and shortages of resources, maximise demands on subject advisors' own judgements on

implementing policy in their curriculum leadership (Spillane & Diamond, 2007). The current study thus proposes to uncover and analyse what judgements subject advisors make and how they make these in their day-to-day exercise of leadership of Mathematics in schools.

Some accounts refer to the difficulties resulting from subject advisors' misunderstanding of curriculum policy and the way that this hinders the implementation process. In curriculum leadership, it is clear from the cognitive theory framework that policy is redefined by subject advisors to fit the locally derived motives and the situation (Neumerski, 2012). According to Spillane (2010), little consideration and effort is given to the way in which subject advisors pay special attention to the stimulus of policy, but they also construct their own sense and ideas from the stimulus. Conventionally, this orientation results from policy researchers who do not pay much attention to the processes, challenges and opportunities by which subject advisors arrive at an understanding of what Mathematics curriculum policies ask them to do. Utilising "a cognitive perspective underscores this process" (Neumerski, 2012:14) of interpretation of policy and provides subject advisors with a foundation on which to base policy interpretation signals, their understanding of Mathematics curriculum policy and the way it transforms their existing practices. In this view, Mathematics policy signals present challenges and opportunities that cannot be predicted in advance (Spillane, 2000; Kahn & Levy, 1995). The ideal is that subject advisors build on Mathematics reform policies, including textbooks, the Internet and other sources, to identify the problems, the transformation processes expected by the Mathematics policy and the transformation activities proposed by Mathematics curriculum experts for addressing problems. It is at this point that subject advisors' cognitive abilities and skills enter the implementation process of curriculum leadership. An understanding of the sense that subject advisors construct from the Mathematics curriculum policy and the way they build meaning for Mathematics policy is vital in understanding their leadership practices.

A cognitive framework involving a general constructivist perspective claims that subject advisors use their previous knowledge and experiences to build new meanings (Spillane, 2000). Anderson and Smith (1987) argue that knowing involves reconstructing existing knowledge as opposed to absorbing knowledge passively

while Resnick (2010) suggests that social, physical, intellectual and cultural factors influence subject advisors' curriculum leadership.

### **2.2.2.1 The cognitive framework and concerns of subject advisors**

When utilising a cognitive framework, social, physical, economic, intellectual and cultural factors play an important role in influencing ideas regarding reformation practices that subject advisors build from Mathematics curriculum policy, in addition to their decisions about whether to execute policy implementation. Societal and physical factors are not the only causes of failure during the implementation of curriculum leadership. The cognitive framework calls for an investigation into the meaning that subject advisors build from Mathematics curriculum policies in their curriculum leadership (Anderson, 2012).

The current study, thus, is aimed at exploring subject advisors' curriculum leadership in secondary schools through an investigation of their responses to Mathematics reform policies as encapsulated in the Curriculum Assessment and Policy Statement (CAPS). The study focused attention on the subject advisors' thoughts, beliefs, concerns and perceptions about giving guidance and direction, which they build from Mathematics reform policies. Secondly, the researcher has explored how the cognitive framework leads us to understand Mathematics curriculum leadership practices of subject advisors and in addition, the researcher wished to investigate the role that subject advisors' teaching proficiency, experience in the subject advisor post, aptitude in the implementation of CAPS and the subject advisors' qualifications play in shaping their curriculum leadership.

In this study, the researcher has related subject advisors' views about their role as curriculum leaders in facilitating and promoting effective teaching and learning of Mathematics to a suitable theoretical framework and, hence, used cognitive theory, intending to shed light on the attitudes, ideas, beliefs, concerns, thoughts, perceptions and understanding of subject advisors' Mathematics reform policies. In doing so, it was hoped to achieve a deeper understanding of the influence of subject advisors' curriculum leadership role on educators' teaching practices and the impact that subject advisors' curriculum leadership has on learner achievement (Hallinger & Heck, 2011).

Whilst extensive research has been done on curriculum leadership in primary and secondary schools in America, Europe and Asia, most of these studies have focused on the principals' efforts to improve classroom teaching and learning. For example, Moore (2009), in support of earlier research by, among others, Hallinger (2008) and Hallinger and Heck (1998), designated principals as the key agents in enhancing overall performance of the school. Spillane and Orlina (2005) studied the relationship between leadership and curriculum reform in schools. In their investigation of leadership practice, they focused on the principal's role in taking a distributed perspective on enhancing curriculum leadership. Reitzug, West and Roma (2008) investigated instructional leadership and paying attention to the voices of principals. In the South African context, Jita and Mokhele (2013) conducted research on lead educators' role in giving guidance and direction, while Mwakapenda (2008) explored interrelationships in the school Mathematics curriculum and the way the connections of the learning outcomes are led.

Although studies in Mathematics curriculum leadership are beginning to emerge, particularly with reference to guidance and direction provided by policies, much less analytical attention has been paid to the Mathematics curriculum leadership of policies from the subject advisor's perspective. That is, analysis of the way in which curriculum policies are planned, formulated, implemented, monitored (controlled) and propagated within the school. Subject advisors' interpretation – the ideas they emerge from and their understanding of curriculum reform policies – have not been directly interrogated and hence the current study attempts to close this gap.

### **2.2.2 York-Barr and Duke Educator Leadership Model**

This model of educator leadership takes into account the roles and responsibilities of subject advisors (Spillane *et al.*, 2004) and the leadership activities shared widely within and/or between educators, subject advisors and learners. These roles and responsibilities are management and administration, subject advisors' personal attributes, leadership work, school conditions, feedback and evaluation of effectiveness as well as intermediary outcomes of leadership work.

Harris (2007) asserts that the York-Barr and Duke model of educator leadership focuses upon the interactions and practices of those informal and formal curriculum leaders. The model primarily focuses on leadership practices and the manner it

influences educators' classroom practices, which in turn influences learner achievement results in Mathematics (Spillane, 2006). York-Barr and Duke's educator leadership model captures the work of all individuals who contribute to the practices of leaders, whether they are formally designated as leaders of the curriculum or not. The model is also the backbone of redesigning or redefining organisations or configuring of systems thereby facilitating lateral as well as flatter processes of decision-making, as positioned by Hargreaves (2007). This model was deemed suitable for this study because it has normative power since it reflects current changes in subject advisors' curriculum leadership role. The demands of the curriculum leadership role of subject advisors calls for a leadership style that is purposefully and actively centred in schools and professional learning communities. Thus, the models of the heroic and singular leader such as the cognitive and behavioural theories need to be strengthened with leadership styles that focus on teamwork as well as individuals, with the emphasis on supporting educators, colleagues as well as learner leaders (Harris, 2004). York-Barr and Duke's educator leadership model has also representational power as it represents different approaches to giving guidance and direction due to increased pressure and demands on schools and districts from both the internal and external stakeholders. Many schools and districts have been through organisational restructuring thereby creating new roles and responsibilities in order to meet the demands of remodelling the workforce, raising the bar, closing the gap and leaving no child behind. With the repositioning and redefining of schools and districts, leadership practices that are extended and shared becomes increasingly important.

Wenger *et al.* (2002) is of the view that as schools engage with complex arrangements that are collaborative, a shared form of leadership is essential to cross-examine multiple kinds of boundaries as well as sharing insights and ideas. In the world of education, which is becoming increasingly complex, the work of curriculum leaders demands varied kinds of expertise as well as leadership styles that are flexible enough to meet new demands and changing challenges of the curriculum leadership role.

Other researchers advocate that, "there is a growing recognition that the old districts and schools' organisational structure do not meet the demands of learning in the twenty-first century" (York-Barr & Duke, 2004:32). New models of leadership through

networking, collaboration and partnerships that are more responsive styles of leadership approaches are emerging to mitigate the complexities of curriculum leadership in the twenty first century. The status of districts and schools calls for a leadership approach that is more flexible, shared and innovative to traverse organisational landscapes that are varied (Ng, Nguyen, Wong and Choy, 2015). It is equally important to note that York-Barr and Duke's educator leadership model has empirical power. Increasing research evidence suggests that the educator leadership model of York-Barr and Duke makes a positive impact on educators' classroom practices and learner achievement results (Bak, 2010), even though the evidence base is still relatively new. Leithwood *et al.* (2007) also concur that the educator leadership model proposed by York-Barr and Duke has a huge probability (likelihood) of improving educator classroom practices as well as learner achievement results.

While York-Barr and Duke's educator leadership model is a powerful theoretical tool to analyse subject advisors' curriculum leadership role, it is imperative to note the challenges; firstly, there can be both conceptual overlap and conceptual confusion arising from the fact that different definitions and terms are used interchangeably to refer to curriculum leadership. For instance, Bush and Glover (2002) and Robinson (2006) talk about instructional leadership as concerning teaching and learning as well as the behaviour of educators as they work with learners connected to the social activity theory, whilst Bak (2010) views curriculum leadership as ensuring quality teaching and learner learning. Hallinger and Heck (2011) note that curriculum leadership is linked to instructional supervision, in the sense that both are done to ensure that educators provide quality education to learners. Accumulation of allied concepts have the potential of obscuring meaning and poses a challenge that curriculum leadership is used as a catch-all term to define any form of leadership practice that is devolved, extended and shared. Secondly, there is implicit tension between the practical and theoretical understandings and interpretations. Theoretically, curriculum leadership can be located in situations, contexts and cognition (Hutchings, 1995) where curriculum leadership is interpreted as practice shared among leaders, followers as well as the situation (Spillane, 2010). Practically, the main concern is on the manner curriculum leadership is shared, with what effect and by whom, as argued by Harris (2008). The focus is on the manner in which

curriculum leadership is maximised for school transformations as well as school improvement. It is concerned with how curriculum leadership and its different forms contribute to learner achievements results; it is about “prescription, prediction and application realms focusing on how curriculum leadership is practiced as well as the underlying leadership patterns that are mostly influential and effective” (York-Barr & Duke, 2004:32).

### **2.2.3 The Angella and Dehart Model of Supporting Schools**

The Angella and DeHart Model (2011) of supporting schools was also used to capture the essence of curriculum leadership and subject advisors’ role in the development or improvement of Mathematics teaching and learning in South African secondary schools. It was used to capture contingent variables, such as background of learners, size of the school, organisational culture, labour features and school community type. This model was used as an analytical frame for understanding the nature and support given to secondary schools by subject advisors. The Angella and DeHart Model of supporting schools serves as a powerful tool for curriculum leaders through offering constructs sets that can be harnessed to inform and diagnose the design processes of curriculum implementation (Neumerski, 2012). Thus, the model serves as both a design and diagnostic tool that can be used as a lens on curriculum leadership practices between and within secondary schools. Schools are afforded an opportunity to stand back, think and reflect on the manner in which curriculum leadership is practised in schools as well as the impact thereof.

The model of Angella and DeHart serves as an analytical frame galvanising attention towards curriculum leadership as being practised in schools as well as the nature of support needed by schools. It focuses attention on the nuances and associations of subject advisors’ curriculum leadership in school settings. Furthermore, the model gives alternative ways of analysing, describing and tracking patterns of interaction, agency and influence. The Angelle and DeHart Model of supporting schools also poses some questions that are critical for schools; for instance, how curriculum leadership is shared and perceived in schools. the manner in which curriculum leadership is enhanced and developed in schools as well as the manner curriculum leadership is extended to learners, parents and the broader community (Sharma, 2012). The model attempts to assess the impact of subject advisors’ curriculum

leadership in school settings. In addition, the model claims that curriculum leadership effectiveness depends on the contextual setting within which it is practised.

Ehren, Altrichter, McNamara and Hara (2012) argue that the model gives the real possibility of scrutinising curriculum leadership through a different lens that challenges the tacit of understanding the interactions among the leader, follower and context. The model suggests that followers and contextual settings are the key elements in shaping curriculum leadership practices in schools. It also raises the probability that curriculum leadership influences organisational transformations when leadership practice is within social contextual settings. In spite of the growing enthusiasm for Angella and Dehart's model of supporting schools, we know little about its effects and causes; hence, it needs to be accompanied with other curriculum leadership models within the research community to capture the essence of causes and effects. The model calls for schools and districts conditions to be redesigned and reconfigured to promote effective curriculum leadership practices in schools (Shadraconis, 2013). However, there is danger of limiting curriculum leadership practice to being influenced only by contextual settings and followers in schools.

The conceptual framework is presented in the next section.

### 2.3 THE CONCEPTUAL FRAMEWORK FOR THE STUDY

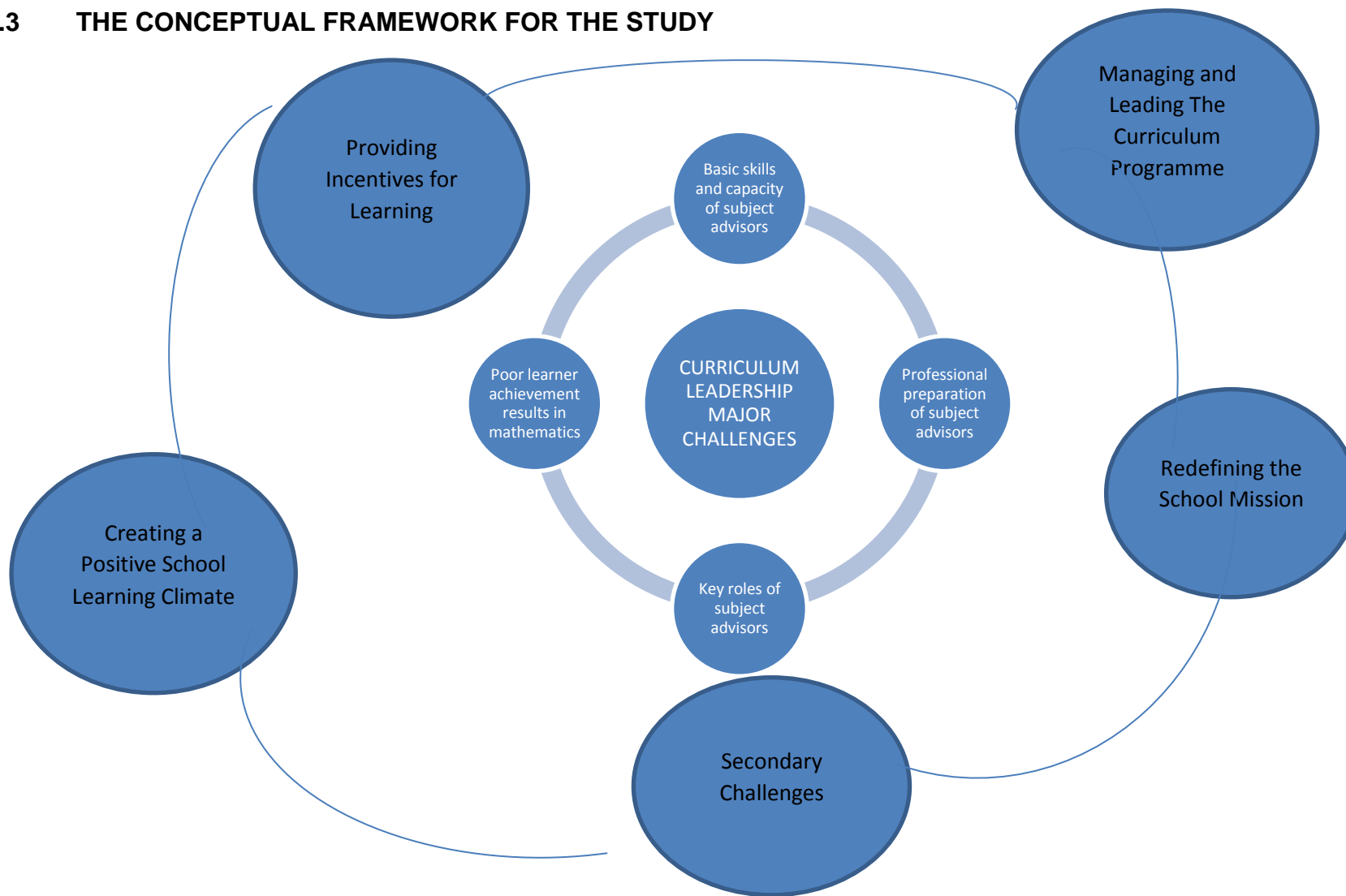


Figure 2.2: Diagrammatic representation of the conceptual framework used in the study

### **2.3.1 Discussion of the Conceptual Framework**

The conceptual framework for this study is derived from the following major challenges, which were identified in the reviewed literature, as represented in Figure 2.2. These challenges are each discussed in detail below.

#### **2.3.1.1 Poor learner achievement results in Mathematics**

Poor learner achievement results in Mathematics prompted this study. Stakeholders began to harbour expectations of subject advisors to bring about transformations in South African secondary schools. The situation called for subject advisors to adopt a specific leadership style that would be effective in improving educators' classroom practices which in turn influences learner achievement results in Mathematics (Harris, 2008). This study identified instructional leadership as the most suitable leadership style for this purpose, based on the literature reviewed, as there is positive correlation between learner achievement results and instructional leadership practices of the subject advisors.

#### **2.3.1.2 Basic skills and capacity of the subject advisor**

The reviewed literature re-emphasised the importance of subject advisors in improving and shaping educators' classroom practices (Waldron & McLeskey, 2010). This aligns with the expectations of subject advisors including managing the curriculum and instruction, inter alia, communicating a shared vision and goals for the district and province, providing educator professional development and monitoring as well as providing feedback on the process of teaching and learning. This study sought to investigate the extent to which subject advisors have the capacity as well as basic skills for engaging in the above-mentioned instructional leadership practices and the impact subject advisors' instructional leadership practices have on influencing learner achievement results in Mathematics. It is evident from the reviewed literature that subject advisors' basic skills and capacity are pivotal in order for them support educators in improving learner achievement results in Mathematics (Dimmock & Walker, 2005; Vithal & Jansen, 2001). The researcher was propelled by this dimension to question whether there is any correlation between districts and/or provincial expectations of subject advisors. Specifically, in terms of their output and the resources that are channelled to support subject advisors with regard to new skills and competence, especially those linked to

the instructional leadership role of subject advisors. This concept formed part of the questions that were included in the structured interviews with the seven subject advisors and ten educators who participated in this study.

### **2.3.1.3 The professional preparation of subject advisors**

From the reviewed literature, the professional preparation of subject advisors as instructional leaders, was recommended by different scholars for future researchers to unpack. The increasingly changing role of subject advisors is independent of the experience of a subject advisor (number of years that one has served as a subject advisor) to enable him or her to adapt to and/or overcome new challenges. Literature reviewed reiterated that the enactment of instructional leadership requires the subject advisor to be multi-skilled, thus forming the prerequisites for instructional leadership (Ng *et al.*, 2015). It also emerged from the literature that there is limited research of subject advisors' instructional leadership role in the context of South Africa. A lack of in-depth training of subject advisors as instructional leaders coupled with administrative duties, such as paper work, which according to Bush, Joubert, Kiggundu, and Van Rooyen (2010) are regarded as time wasting. There was a link between the problem of lack of subject advisors' professional preparation and the recruitment as well as appointment of subject advisors as instructional leaders.

### **2.3.1.4 Recruitment and appointment of subject advisors**

In South Africa, the recruitment and appointment of subject advisors is based on the following criteria; he or she must hold a Relative Qualification Value (REQV) 13 as a minimum qualification, must be of good character and the potential subject advisor must have been an educator for a minimum of five years. The REQV 13 is an educators' diploma, which requires the potential candidate to have been trained for at least three years to qualify to become an educator. From this requirement, a question that emanates is whether an educator's minimum qualification of RQV 13 includes module or modules that capacitate and prepare them as instructional leaders and if not, does any person holding RQV 13 qualify to become a subject advisor? While the RQV 13 qualification plus five years' experience stipulated as requirements for the subject advisor's post are very low when compared to the complexity of the instructional leadership role of subject advisors, it is questionable if

a qualified person with RQV 13 and many years of teaching experience will make a good instructional leader.

### **2.3.1.5 The secondary challenges**

The secondary challenges in the conceptual frameworks are the three variables related to the instructional leadership role of subject advisors. These four curriculum leadership dimensions include redefining the school mission, managing the curriculum programme, promoting a positive school learning climate and providing incentives for learning. These four variables form the entire conceptual framework of this study.

Even though there is no single agreed model of curriculum leadership, a model developed by Hallinger and Murphy (2005) is the one mostly used by researchers, as claimed by Hallinger (2009). Even though this study is about subject advisors' curriculum leadership role, the model of Hallinger and Murphy (1985) is the one that forms the basis for all discussions around curriculum leadership in schools and at district offices. Hence, it is imperative to understand Hallinger and Murphy's (2005) model, so that the Mathematics subject advisors' curriculum leadership is better understood. The model has the following four curriculum leadership dimensions: redefining the school mission, managing and leading the curriculum programme, creating a positive school learning climate as well as providing incentives for learning. These four dimensions are subdivided into defined job functions, as discussed in the subsequent sections.

#### **2.3.1.5.1 *Redefining the school mission***

The subject advisor as a curriculum leader must communicate with school principals, educators and learners about the school's mission and vision. Therefore, as a curriculum leader, the subject advisor must know the goals of the school and must make educators and learners understand the vision and mission so that they are part of it.

##### **i. Framing school goals**

In framing the goals of the school, the subject advisor needs to work with principals closely in order to understand that the school principal must focus educators, as well as learners, on a few clearly defined goals, so that they can be easily achieved. The

goals should be on improving learner achievement results in Mathematics and they should be based on the data of quarterly learner achievement results (Bush, 2013).

## **ii. Communicating school goals**

Communication is key and, in this case, it is about the way the subject advisor communicates goals to educators, learners as well as parents. During that communication, the subject advisor must emphasise the importance of goals, which can be done during formal communication and on informal communication including staff bulletins, parent meetings as well as staff meetings. Informal communications include conversations with staff (Nakum, 2011).

### **2.3.1.5.2 Managing and leading the instructional programme**

The subject advisor, as a curriculum leader, must be able to manage and lead curriculum programmes through interacting with educators on issues relating to curriculum and teaching. In managing the curriculum programmes, the subject advisor must be able to update educators with the latest curriculum developments, so that he or she is able to check the progression of work schedules (Atteberry *et al.*, 2008).

#### **i. Supervising and evaluating curriculum**

The activities of the district and those of a classroom must be coordinated by the subject advisor. The subject advisor must provide curriculum support to educators and should do class visits in order to monitor teaching and learning (Pinnock, 2011). The subject advisor must also check educator files and work of learners apart from conducting classroom visits.

#### **ii. Coordinating the curriculum**

Coordinating the curriculum is very important in the teaching and learning of Mathematics as it enables the subject advisor to align the objectives of the school curricular with both learners' achievement results and the content that must be taught. As a curriculum leader, the subject advisor must establish as well as be part of the curriculum committee in schools as advised by Christou, Eliophotou-Menon and Philippou (2004).

### **iii. Monitoring learner progress**

When used in a school, standardised tests are a good tool in identifying problems in terms of learner achievement results as well as educator performance. The subject advisor can then use the data from those tests in his or her discussion with the educators to evaluate teaching and learning and monitor learner progress (Bennett, 1995). This means that the subject advisor must analyse learner achievement results in Mathematics and use the data to identify problems so that intervention could be implemented where it is most needed.

#### **2.3.1.5.3 Promoting positive school learning climate**

This dimension comprises learner and educator attitudes. As a curriculum leader, the subject advisor must create a climate for positive teaching and learning of Mathematics in schools. This can be attained through the careful use of school time, implementation of educator development programmes as well as reinforcement of learner achievement results (Coleman, 2001). The subject advisor is also expected to workshop educators about the code of professional ethics and related education policies in schools, so that educators will know what is expected of them.

### **i. Protecting curriculum time**

The maximum use of curriculum time is important in improving learner achievement results in Mathematics, hence the subject advisor must guard against the interruption of effective teaching and learning of Mathematics (Ng *et al.*, 2015). If the subject advisor has a policy in place which could effectively be implemented, it would prohibit the unnecessary wastage of teaching and learning time; for example, prohibiting meetings during teaching time as well as not allowing sports activities during the normal school day.

### **ii. Promoting educator professional development**

Through providing educators with in-service training, linking educator professional development with the school goals and informing educators about the available educator professional development opportunities, the subject advisor can promote educator professional development. The subject advisor may organise workshops for educators in areas that have been identified as being challenging. The subject

advisor must also inform educators about any future workshops as well as encouraging educators to further their studies.

### **iii. Maintaining high visibility**

The subject advisor must find time to interact with all educators and learners on an informal basis. This can be done through being visible around the district schools, so that educators as well as learners are offered the opportunity of having informal meetings with the subject advisor. The subject advisor can get more information about the situation of his or her schools through Managing by Wandering Around (MBWA); for example, through walking around schools, checking whether teaching and learning of Mathematics is taking place as well as checking the buildings and the school environment (Williams, 2010).

### **iv. Providing incentives for educators**

The subject advisor must recognise the work of educators and find ways of rewarding educators for their effort and dedication to their work in creating a positive teaching and learning climate (Leithwood, 2010). The subject advisor must promote incentives for educators to recognise their performance and that can be done by giving awards to educators, which could be done through holding educator of the month awards, issuing of trophies and certificates.

### **v. Developing as well as enforcing academic standard**

The subject advisor must set high standards which are clearly defined thereby creating high expectations, hoping to get improved learner achievement results in Mathematics. Through district and circuit meetings, the subject advisor must set the expected pass rate targets for the following year, so that educators work towards achieving that expected goal.

#### **2.3.1.5.4 Providing incentives for learning**

Through recognising and acknowledging improvements of learner achievement results in Mathematics, the subject advisor must create a positive learning environment in the school and that can be done through rewarding learners. The role of a subject advisor as a curriculum leader and all these dimensions are used worldwide as the basis for curriculum leadership in schools as well as in education

district offices. Incentives for improved learner achievement results in Mathematics, learners showing an improvement in Mathematics as well as those performing well may be given certificates by the subject advisor. Curriculum leadership has five themes which are expected to be found in a leader practising curriculum leadership (Hoadley & Ward, 2009). These themes are distributed leadership, social context, pedagogical expertise, categorisation of effective curriculum leadership and linkages, as discussed in the next section.

#### **i. Distributed leadership**

Curriculum leadership cannot be practised by a leader in isolation. For curriculum leadership to be effective, it must involve all role players. Hence, the subject advisors must enable the heads of schools, HODs and educators to build the capacity to become curriculum leaders in their own areas, so that all the educators and the principal in a school are able to practise curriculum leadership which would contribute positively to learner achievement results in Mathematics.

#### **ii. Social context**

The social context of a school can be the population of the learners, and factors such as whether a school is primary or secondary and the geographic location of the school.

#### **iii. Pedagogical expertise**

It is imperative that a subject advisor as a curriculum leader must have an understanding and knowledge of the subject since curriculum leadership is about teaching and learning of Mathematics. This implies that the subject advisors must be leaders in their subjects, and they must be able to workshop, mentor, give support as well as monitor educator learner performance. If the subject advisors are experts in their fields, this can be done successfully, and if they are not, support is needed from both the district and provincial offices.

#### **iv. Categorisation of effective curriculum leadership**

It is of critical importance to understand the different functions that are executed by an effective curriculum leader, as this sheds light on the understanding of subject advisors' curriculum leadership. In Western countries, it is worth noting that

curriculum leadership is focused on the school principal and he or she should practice curriculum leadership in schools alone. The school principal must then share the practices of curriculum leadership with educators, who are then expected to improve their teaching and classroom practices, hoping to improve learner achievement results in Mathematics. At the level of the district, it is only the (superintendent) subject advisor, who in turn monitors the performance of the school principal in terms of curriculum leadership. This is evident from the models of curriculum leadership as well as its definitions from the Western countries: the emphasis is on the school principal (Waldron & McLeskey, 2010).

In Africa, the district offices and schools interact directly with subject advisors. Even though the district officials interact with the school principal, it is mainly on management issues. When it comes to curriculum leadership, HODs and subject advisors are contacted. Since most of the literature about curriculum leadership comes from the Western countries and not Africa, curriculum leadership is thus seen as the sole function of school principals (Southworth, 2000). This idea needs to be challenged by exploring the curriculum leadership role of Mathematics subject advisors and the manner in which it influences Mathematics teaching and learning in South African secondary schools.

#### **v. Linkages**

A curriculum leader is also an instructional leader, so curriculum leadership is linked with leading, management, instruction and curriculum. Those linkages would function properly if their characteristics were clear, if there are proper functioning structures, if the mission is understood and if there are channels of communication.

### **2.4 HISTORICAL BACKGROUND OF MATHEMATICS SUBJECT ADVISORS' CURRICULUM LEADERSHIP**

As previously indicated, curriculum leadership as well as school leadership has been historically viewed as the sole responsibility of the head of the school. However, heads of schools have come to depend on the specialised knowledge of Mathematics subject advisors to offer curriculum leadership in Mathematics since schools have become more complex in terms of the subjects that schools offer. Ng *et al.* (2015) claim that subject advisors are specialists in their subjects with the

responsibility of establishing as well as ensuring high quality teaching and learning of Mathematics. Hallinger and Heck (2011) view subject advisors as district subject specialists having the task of managing as well as leading Mathematics teaching and learning. Mathematics subject advisors' curriculum leadership tends to depend on the context as Mathematics has its history, philosophy, culture as well as values that are unique as advocated by Ng *et al.* (2015). Moreover, the perceptions, relevance and status of Mathematics as well as its department often dictate educator professional development and resources decisions (Lai & Cheung, 2013). Mathematics is a subject with its own status and philosophy regarding the manner in which it should be taught and sometimes content is complicated by both educators and learners' attitudes towards Mathematics. This complexity of Mathematics has prompted the proposed study to investigate the nature as well as practices of Mathematics subject advisors' curriculum leadership role in South African secondary schools and how Mathematics subject advisors' curriculum leadership influences effective teaching and learning of Mathematics. In this study, the researcher attempted and intended to understand the curriculum leadership roles and practices experienced by Mathematics subject advisors in the Free State province of South Africa.

#### **2.4.1 Reflections on Learner Achievement Results in Mathematics**

Kahn (1994) attributes the crisis facing Mathematics education in South Africa to the following concerns: What is taught? Who is being taught? Who are the educators? What are the objectives (outcomes)? How is infrastructure and support? In dealing with these concerns, Kahn (1994) found out that many South African learners do not take Mathematics and Science beyond Grade 9. Learners' learning challenges are exacerbated by the undertrained educators, inappropriate textbooks coupled with the culture of rote learning, as claimed by Department (DBE, 2015). Mathematics as a subject, has a language of its own, worsened by the language demand of the syllabus. Furthermore, Kahn (1994) argues that one factor leading to poor performance is that learner enrolment by South African learners is largely skewed towards the higher grade level in Mathematics and Science. This choice of enrolling for Mathematics and Science is probably motivated by the desire to proceed to university, which in most cases is never realised.

Malinga's (2016) study of the 2015 Mathematics results shows that the National pass rate in Mathematics was 58,2%. In the Free State, the pass rate for Mathematics was 59,8%. Reasons cited for this result was a lack of confidence in Mathematics educators and under resourced libraries preventing learners from doing projects, investigations, as well as assignments. These results indicate the broader problem of learner retention, educator preparation, inadequate facilities and materials, lack of guidance and support of curriculum delivery and examination strategies. The consequence is a dearth of learners qualifying for entry into higher institutions of learning.

Universities and colleges of education, therefore, have a perennial shortage of students wanting to study Mathematics. The number of educators graduating from universities and colleges is far too small to make an impression on the human resource needs in schools (Carlisle & Berebitsky, 2010). As claimed by the Free State Department of Basic Education (DBE, 2014), educators' subject content knowledge as well as professional confidence is generally poor. A cycle of mediocrity perpetuates itself through their efforts in the classroom (DBE, 2010). This cycle is reinforced by the unsuitable nature of the Mathematics curriculum, which is challenging, as well as overloaded with many topics. However, the government has initiated intervention strategies like Students and Youth into Science, Technology, Engineering and Mathematics (SYSTEM) with the hope of improving learner achievements results in Mathematics. The intervention strategies have been designed to deal with the on-going problems characterising Science as well as Mathematics education in South Africa, which is also connected to educator training and development. It seeks to address this challenge through recovering large numbers of senior certificate learners who have underperformed in these subjects. The other programme known as MASTEC (The Mathematics, Science and Technology College), is based in the North West province and focuses on producing Mathematics and Science educators at pre-service (PRESET) level as well as providing training programmes for educators in local schools, as maintained by (DBE, 2011).

The question of who the educators are may be answered by analysing the quality of educators generally in South Africa as well as in the Free State Province. Even though most Mathematics educators are trained as educators in universities and

colleges, an insufficient proportion of them are trained in the subject they are teaching. In addition, as claimed by Arnott and Chabane (1995:21), educators are largely newcomers to the field and have not yet acquired experience through training. The average age of Mathematics educators in the Free State Province is 32,5 years (DBE, 2014), which confirms the above statement. In 2013, 74% of Mathematics educators in the Free State had less than six years' experience while 15% had over 10 years' experience (DBE, 2018). According to research done by Potchefstroom University for Christian Higher Education (PU for CHE) (2012), the average experience of Mathematics educators in 2011 was 3,4 years and that of science was 3.9 years. In addition, it is interesting to note that Mathematics educators in the Free State devote 46% of their teaching time to the teaching of other subjects (FSDBE, 2013). The 1995 study conducted by Arnott and Chabane's indicates that 42% of Mathematics educators across seven provinces in South Africa have been teaching for two or less years and 65% for five or less years, hence the need for exploring subject advisors' curriculum leadership role, that is, the kinds of support that is given to novice educators by Mathematics subject advisors.

Studies conducted in South Africa (see Howie, 1997; Mwakapenda, 2008; Pinnock, 2011) indicate that as far back as the 1990s, there has been a severe shortage of properly qualified Mathematics educators in secondary schools. The shortages have been unfortunately masked by the well-published surplus of educators in other areas of education. The problem is exacerbated by the fact that many trained Mathematics educators at colleges and universities have chosen the course as a second or third option, having failed to be selected for their careers of first choice. The demand and supply of Mathematics educators in the Free State indicates that there is an undersupply of secondary school Mathematics educators (FSDBE, 2014). At least 38% of these educators are under qualified. A survey conducted by the Free State Department of Basic Education indicates that for about 300 Mathematics educators, one third of the Mathematics provincial population, their highest qualification is matriculation in Mathematics and a diploma in secondary teaching with some not even having this qualification. Only 180 educators or 60% have their highest qualification as third year university Mathematics. Fifty-nine (59) educators or 20% have as their highest qualification, fourth year Mathematics and are essentially bachelor of science (BSc.) graduates. The same is true for the 25 educators or 9%

(9/100) whose highest qualification is fourth-year university training in Mathematics. All these 25 educators have master of science (MSc.) degrees (FSDBE, 2014).

The above studies have a commonality in that they highlight the recent trends in the quality of Mathematics educators in the Free State and in South Africa generally. This raises the question on the quality of Mathematics educators generally and in the Free State, access to Mathematics as a subject, the quality of training and support offered to educators by Mathematics subject advisors as well as the infrastructure for teaching and learning of the said subjects at school, colleges and universities.

Another factor, which is a matter of concern, is the attrition rate of Mathematics educators. The Department (DBE, 2013; DBE, 2010) claims that Mathematics secondary school educators do not stay in the profession longer than three years and that the attrition rate of Mathematics educators is relative to the national norm which is very high. The Free State Department of Basic Education (2014) claims that the attrition rate of Mathematics educators in the Free State is estimated at 14,9%. It is clear from the above discussion that the training of educators at colleges and universities needs to be strengthened with the nature of support and educators' professional development programmes offered by subject advisors. Knowledge about how Mathematics subject advisors support Mathematics educators with the hope of improving educators' classroom practices remains sparse. There is a regulatory framework or policies that guide the curriculum leadership role of Mathematics subject advisors (Jones, 2010). Hence, the current study deemed it necessary and important to explore the subject advisors' curriculum leadership role in terms of the support subject advisors offer to Mathematics educators. Colleges within the traditionally Black education system have a major challenge in preparing Mathematics secondary school educators adequately for the field of work (Lai & Cheung, 2013). The Mathematics subject advisors play an essential role in this regard in the Free State with the need becoming more pronounced with the introduction of the CAPS in 2010. CAPS was announced on July 30, 2009 by the National Department of Basic Education with a view to have the first learning programmes for implementation in 2010. While paying attention to CAPS and new curriculum reform policies in Mathematics, it is imperative to take stock of the state of facilities in secondary schools. For example, in the Free State, Mathematics as a subject, experiences the following challenges:

- Shortages of Mathematics laboratory equipment – 60%
- Poor library – 43%
- Shortages of laboratories – 42%
- Shortages of textbooks – 41% (FSDBE, 2014)

Seventy-eight (78%) of the educators identified inadequate training as the principal problem in their teaching. The Free State Department of Education (2014) indicates that most of the laboratories are small, classes are overcrowded and there is a lack essential facilities such as overhead projectors and computers. Some Mathematics laboratories are used as storerooms, educator offices and media centres. These environments are far from ideal conditions for the effective teaching and learning of Mathematics in South African secondary schools.

One of the six key priorities for education recommended by the World Bank is paying attention to objectives (outcomes) (Gabbard, 2012), with investments in education needing to be related to objectives of education, which in turn are seen as being able to make a contribution to a country's economy. Educators need to undergo intensive support, training and professional development initiatives within the context of whole school development in order to equip them with the required skills, knowledge and competence for dealing with CAPS and other innovations in Mathematics, as claimed by Tsoetsi and Mahlomaholo (2015). Regular school-focused training and programmes needs to be integrated into the continuous education of educators coupled with district organised training as well as the supply of adequate resources (Harris, 2008). The Centre for Educational Policy Development (CEPD, 1995) states that it is a common fact that no curriculum reform implementation and development can take place without educator support, training and development. A reciprocal approach to facilitating and promoting educator and curriculum development is essential hence, the need to explore the curriculum leadership role of Mathematics subject advisors; for example, the types and quality of support, training and development provided to educators by Mathematics subject advisors needs to be scrutinised. The new CAPS curriculum poses challenges to the Mathematics educators' methodologies, strategies, resources for learners and educators and support system to the educators in order to deal with the challenges.

#### **2.4.2 Basic Skills, Knowledge and Competence of Subject Advisors**

Kruger (2003:207) defines competence as “an integrated package of knowledge, attitude and personal characteristics”. Subject advisors are supposed to be competent regarding the skills and knowledge needed for effectively executing their curriculum leadership duties. Bennet *et al.* (2003) established that subject advisors’ authority depended on their competence levels and subject knowledge. However, Bak (2010) suggests that subject advisors are not well equipped to execute their curriculum leadership duties which align with Spillane and Diamond (2007) view that subject advisors were not sure if they had enough knowledge to guide educators, offer advice and give direction to the process of teaching and learning. Skills connected to the curriculum leadership role of subject advisors are communication and interpersonal skills, which according to Heng and Marsh (2009), are viewed as key to giving effective guidance and direction to curriculum reform policies as well as influencing educators.

Both Bak (2010) and Maluleke (2015) see these skills as relating to the ability of motivating and promoting departmental teamwork. Interpersonal and communication skills enable subject advisors to gain support, effect teamwork and cooperation to achieve the targeted departmental goals. Communication also emerged as crucial to subject advisors’ curriculum leadership because they are expected to translate Mathematics reform policies into practice in classrooms. According to Hammond, Wei, Andrew, Richardson and Orphans (2009), effective communication is vital to promote effective teaching and learning of Mathematics. Monyatsi (2006) states that interpersonal and communication skills play an important role when subject advisors must provide feedback to educators about teaching and learner learning, premised on the suggestion that feedback should be provided in a non-threatening environment as opposed to the current practice of subject advisors.

#### **2.5 THE PROFESSIONAL PREPARATION OF SUBJECT ADVISORS**

Bak (2010) claims that principals are no longer the only instructional leaders in schools as most are not directly involved in the leadership of teaching and learning. Curriculum leadership in schools remains the core duty of subject advisors (Kruger, 2003). Due to the pressure that is exerted on principals and deputy principals, Bush (2008:8-9) argues that the subject advisors are instructional leaders in schools. In

addition, subject advisors are usually highly experienced and successful classroom practitioners. A study by Hoadley *et al.* (2009) revealed that principals spend most of their time on a combination of administrative functions and disciplining of learners. Instructional leadership was broadly found to be a responsibility that many principals paid little attention to or concentrated on.

In Singapore, schools are categorised to form clusters and each cluster is under the supervision of a superintendent, who also acts as a mediator between the district offices and the schools (Ng *et al.*, 2015). The Singapore system enables subject advisors to be developed as curriculum leaders and this ensure that the district offices monitor effective teaching and learning of Mathematics in secondary schools throughout the year (Jones & Harris, 2010). It provides opportunities also for those who want to continue with teaching to remain there but being supported throughout their careers (Koh *et al.*, 2011). However, in South Africa, the professional preparation of subject advisors is not clear.

## **2.6 THE POLICY FRAMEWORK GUIDING THE FUNCTION OF MATHEMATICS SUBJECT ADVISORS' CURRICULUM LEADERSHIP**

The policy and/or regulatory framework that guides and/or regulates subject advisors' curriculum leadership role differs from country to country. In certain countries, there are clearly stipulated roles and responsibilities but in other countries including South Africa, they are units, which must enhance curriculum leadership but fail to function because of the lack of clear guidelines and the commitment from the Department. A study conducted in Pakistan by Jaffer (2010) reported that schools have inspectors as well as the supervisors, a system established in the colonial period. Over the years, however, the terminology has changed but not the way subject advisors do their job. The inspection system in Pakistan has not focused on assisting schools in performing better, but on compliance with administrative as well as legal requirements. The inspection deals with financial and academic audits, the role of overseeing the running of examinations in schools, offering advice and support of educators as well as reporting the subject performance of schools to the Department, as stated by Jaffer (2010). On the other hand, the importance of subject advisor's curriculum leadership in working with schools in Pakistan is worth noting as

this may have been important in improving learner achievement results in Mathematics, as it offers continuous professional development of educators.

Changes have taken place over the years in the education system and the curriculum leadership role of subject advisors has changed in terms of including more work such as administration as well as education management (RSA, 1998a). There are factors hindering subject advisor's curriculum leadership role of supporting schools, as pointed out by Jaffer (2010) and Janney (2010) include the lack of clarity on policies and procedures that may hinder subject advisor's curriculum leadership practices. In addition, subject advisors need to specialise to support educators in terms of effective teaching and learning of Mathematics and educator professional development. However, the lack of a clear process of recruitment of subject advisors is another important factor. Government employees in middle management (between lower-level employees and top management) as well as senior level are considered for positions based on seniority and eligibility of internal transfers. A subject advisor in Pakistan is on the same grade and salary scale as an educator at a secondary school is of concern and the lack of a clear job description with the performance standards for this position compound the challenges. Jaffer (2010) argues that even though changes have been made, monitoring and supervision is ineffective as there is no system of collecting, analysing as well as reporting data, which then cannot assist in informing the improvement of learner achievement results in Mathematics.

Memduhoglu *et al.* (2007) study clearly indicates detailed aims and roles of subject advisors (supervisors) in Turkey as opposed to South Africa where the roles and responsibilities of subject advisors are not clearly defined. The aim and the principles in supervision unveil firstly what is expected of any supervisor during his or her tenure (functioning) as a subject advisor. Subject advisors are divided into elementary school supervisors focusing on elementary and preschools and ministerial supervisors focusing on secondary schools. Supervising as well as evaluating educators are some of the responsibilities and authorities of subject advisors (ministerial supervisor) in secondary schools (Janney, 2010). In addition, it includes training in practice as well as professional assistance. Furthermore, subject advisors must deal with supervising examinations, seminars and courses and educators must provide the supervisor with all the required documents. The subject advisors also check on the progress of the recommendations, which were made on

previous school visits. The records of the observations are kept for future supervisors to understand the situation of that school. It is important to note that these subject advisors are not able to contribute to the improvement of learner achievement results in Mathematics, because there is no one monitoring the implementation of suggestions and recommendations made by subject advisors in schools (Collier *et al.*, 2002; Leon, 2010). The subject advisors evaluate educators on performance during lessons, efficiency of the educator in asking questions, knowledge and skills development of learners, examinations and assignments given to learners, application of the curriculum and lesson plan as well as when observing educators in class. However, the findings emerging from Memduhoglu *et al.* (2007) revealed that much of the time subject advisors use during school visits is spent on paper work, monitoring and giving reports instead of developing educators in terms of improving quality teaching and learning of Mathematics, which in turn influences learner achievement in Mathematics.

The study by Ehren *et al.* (2012), conducted in six European countries and viewed as pivotal, concerned the issue of subject advisor's curriculum leadership role and the manner it influences learner achievement results in Mathematics as well as quality teaching and learning. Even though different countries use different approaches in terms of subject advisor's curriculum leadership, they are all aimed at improving the quality of teaching and learning, which in turn influences learner achievement results in Mathematics (Harris & Muijs, 2004). The subject advisors in England, Ireland, Sweden, Netherlands, Czech Republic and Austria, through the inspection of schools, are able to assess the quality of education (Ehren *et al.*, 2012). Data on learner achievement results and classroom observation is analysed and based on that data, schools can be held accountable for learner achievement results in Mathematics. The power of subject advisors varies from country to country but pedagogical as well as didactical behaviour of educators and the classroom observations assist in monitoring the quality of teaching and learning (Koh *et al.*, 2011) and lesson plans are examined to monitor the quality of lesson presentations and the school curriculum. The inspection is divided into specific characteristics, which assist in identifying the features of school inspection. Some of these characteristics are discussed in the next sections.

### **2.6.1 Types and Frequency of Inspection Visits**

There are different methods used to gather information in schools. Ehren *et al.* (2012) found that the inspectorates of education use cyclical school inspections and differentiated inspections. Cyclical inspection is conducted in all schools and differentiated inspection is for those schools, which must improve on learner achievement results (underperforming schools). In the Netherlands, early warning analyses are used to plan for subjects that are not performing (dysfunctional) at an acceptable level and in Austria, schools which are graded as inadequate, fall into the category of monitoring inspection (Highfield, 2010). However, in South Africa it is only when Grade 12 (National Senior Certificate – NSC) results are released in January that schools can be identified and classified as performing or underperforming schools.

### **2.6.2 Standards and Threshold**

The standards and criteria determine the quality of education in a school. European countries have three types of standards: standards of the context and process quality of education, the standards of performance or school results and legal standards, which have to do with the compliance of a school with the regulations. Inspectors (subject advisors) in Sweden check to see whether the schools can provide all learners access to quality, equal education as is the case with South Africa (Bush *et al.*, 2010).

### **2.6.3 Sanctions, Rewards and Interventions**

Secondary schools, which do not perform at an acceptable level, are closed or fined. Schools with good learner achievement results in Mathematics receive awards or financial bonuses for their hard work. At times, the subject advisors intervene and then monitor learner achievement results in Mathematics. The subject advisors (inspectors) may temporarily close a school in Sweden and they do intervene in schools, which are underperforming in Ireland (Collier *et al.*, 2002). However, in South Africa the subject advisors only intervene in underperforming schools and do not have the advantage of temporarily closing schools.

#### **2.6.4 Feedback during Inspection Visits**

The schools are given feedback on learner achievement results in Mathematics through the set standards. During this process, some subject advisors advise schools on ways of improving learner achievement results in Mathematics and others are allowed only to evaluate learner achievement results in Mathematics without giving advice (and are not permitted to give advice). Feedback is normally given to the school principal or the entire staff during a meeting after the inspection. Individual educators, who may have been observed in the classroom, are also not given feedback even if they may ask for it (Carlisle & Berebitsky, 2010), except in Ireland. In South Africa, educators are given feedback at a later stage in the form of a report.

#### **2.6.5 Dissemination of Results**

The results of school inspection are published by the inspectorate of education which points out the weaknesses of the schools and deal with the ways in which schools function. The public reporting may also include the list of underperforming or dysfunctional schools as claimed by Leon (2010).

### **2.7 THE POLICY FRAMEWORK GUIDING SUBJECT ADVISORS' CURRICULUM LEADERSHIP IN SOUTH AFRICA**

In South Africa, curriculum leadership has been broadened as it is not practised only by the school principals but also subject advisors, HODs, senior educators, subject heads and the school management teams (SMTs), as maintained by Van Deventer and Kruger (2003), which is consistent with the Collective Agreement 1 of 2008, which ensures that senior educators, master educators as well as HODs work as curriculum leaders together with school principals. In most cases, school principals have not received special training on curriculum leadership even though they are expected to be at the forefront of curriculum leadership, as argued by Hoadley *et al.* (2009). Even though there is that lack of training, Hoadley *et al.* (2009) refer to certain studies that have been conducted in South Africa (see Monyatsi, 2006; Mwakapenda, 2008) indicating that school principals who are able to use resources effectively, contribute to the improvement in learner achievement results in Mathematics. The importance of regulation of time in improving learner achievement

results is pointed out by these researchers. According to Gustafsson and van der Berg (2005), Gabbard (2012), Taylor and Owusu (2013) and Van der Berg *et al.* (2005), the monitoring and support for planning and curriculum delivery has emerged as an important factor in improving learner achievement results in Mathematics. Quality assurance of tests as well as the monitoring of results, which was pointed out by Kanjee and Prinsloo (2005) and Taylor and Prinsloo (2005), is another important factor that improves learner achievement results in Mathematics. It is important to note that both Hoadley *et al.* (2009) and Spaul (2014) point out that the presence of school resources alone does not contribute to an improvement in learner achievement results, but also the manner in which those resources are aligned and used.

It is important to focus the discussion on the change in policies in South Africa over the past years, because that has led to the changing roles of Mathematics subject advisor's curriculum leadership. In South Africa, since the start of democracy, changes have been taking place in the education system. One change has led to the promulgation of the Employment of the Educators Act (76 of 1998), dealing with the conditions of employment for educators. This Act encompasses schools-based or institution-based educators as well as office-based educators. Educators working in primary and secondary schools from Grades R to 12 are school-based educators. Educators working in Further Education and Training Colleges (FET) are institution-based educators and those educators employed at departmental offices are office-based educators. Subject advisors, based at district offices and considered office-based educators, is expected to be subject specialists. Office-based educators also include the director of education, chief, deputy chief, first, senior education specialists in terms of the Employment of Educators Act (76 of 1998) (RSA, 1998a). The roles and responsibilities of office-based educators include communication, financial planning and management, leadership, transformation and strategic planning, research and development, staff development and general, curriculum delivery and policy.

The Guidelines on the Organisation, Roles and Responsibilities of Education Districts were introduced in 2011 (DBE, 2011) followed by the Policy on the Organisation, Roles and Responsibilities of Education Districts (DBE, 2013). The roles and responsibilities of each member of the district office is clearly stated by

these two documents, unlike the Employment of Educators Act (76 of 1998), which simply deals with the general functions of office-based educators without being specific about each post. A subject advisor is described as a specialist office-based educator in a district office or circuit office whose function is to facilitate curriculum implementation and improve the environment as well as the process of teaching and learning by visiting schools, consulting with, and advising school principals, HODs and educators on curriculum matters (DBE, 2011).

An agreement was reached in 2008 between the organised labour and the Department of Basic Education in the Education Labour Relations Council and that agreement is Collective Agreement 1 of 2008. The job description for school-based and office-based educators is provided by Annexure A of this agreement. In terms of this agreement, the post of a subject advisor was created to ensure that there is special capacity to provide and/or source relevant teaching and learning material to improve learner achievement results in Mathematics, to support educators in strengthening their content knowledge and thus, delivering the curriculum effectively. In addition, to support and monitor the implementation of the curriculum in the teaching and learning of Mathematics in schools. It remains not clear as to how subject advisor's curriculum leadership is practiced and the way it influences learner achievement in Mathematics (Dunmock & Walker, 2000).

In the South African context, the work of subject advisors is guided by the Employment of Educators Act, 64 (1998). In terms of this Act, subject advisors' job is dependent on the approaches and the needs of a province, district or school. The work of subject advisors is not limited to administration, teaching, personnel management, extra and co-curricular activities and communication. The core responsibilities of the subject advisors are set out by the Department of Education (DoE, 2000).

The Policy on the Organisation, Roles and Responsibilities of Education Districts (DBE, 2011) describes the roles of education district office as planning, oversight and accountability, supporting and public engagement, each of which is discussed below.

### **2.7.1 Planning**

Planning involves collecting and analysing school, circuit and district data to inform planning (Weindling, 1999). In addition, this entails assisting schools in compiling school improvement or development plans. Integrating school improvement or development of plans into district plans is a way in which the challenges of Mathematics teaching and learning are addressed by all stakeholders jointly (Maluleke, 2015).

### **2.7.2 Oversight and Accountability**

Oversight and accountability mean holding school principals in the district accountable for learner achievement results. It also includes accounting to the provincial education department for the performance of schools in the district as well as accounting to the provincial education department in terms of performance agreements stipulating the roles, responsibilities and function of district officials in consistency with the relevant policies (Leon, 2010).

### **2.7.3 Supporting**

Supporting entails providing an enabling environment and targeted support for educational institutions within the district to do their work in consistency with education policy and law. It also has to do with assisting school principals, SMTs and educators in improving the quality of teaching and learning in their institutions through school visits, classroom observation, consultation, suitable feedback reports, cluster meetings and other means. Lastly, providing an enabling environment and organising provision as well as support for the professional development of curriculum managers, educators as well as administrative staff members is another aspect of support (Gabbard, 2012).

### **2.7.4 Public Engagement**

Consulting as well as informing with the public in an open manner that is transparent refers to public engagement (Harris, 2004). In terms of this policy, a district office should be organised into teams; district management and governance support team, district examination and assessment team, district operations team, district curriculum support team and district learner support team.

## **2.8 MATHEMATICS SUBJECT ADVISORS' CURRICULUM LEADERSHIP FOR THE IMPROVEMENT OF MATHEMATICS INSTRUCTION**

Communicating policies with educators, providing professional advice to educators, coordinating learning activities as well as ensuring the maintenance of high-quality teaching and learning are some of the curriculum leadership roles of subject advisors in Nigeria, as stated by Kalawole (2012). The subject advisors also carry out full inspection, which includes inspecting furniture, buildings, learners and staff records, library facilities, attendance registers, logbook, schemes of work and equipment. This full inspection is also done in South Africa by a team of inspectors who visit schools and spend almost the whole day inspecting all the records and school activities.

In Ghana, Prew and Quaigrain (2010) conducted a study about the use of data from secondary schools collected by the subject advisors to improve learner achievement results in Mathematics. Schools and district officials work together in Ghana in planning and supporting each other and they use a platform called School Performance Review (SPR). The district is not only able to gather the necessary data about the school through SPR, but they are able to get views from all stakeholders as to how the performance of the school can be improved and hold the schools accountable for learner poor achievement results in Mathematics.

This process commences with a district office team that collects data on management, classroom performance and governance. After the district officials (subject advisors) have analysed the data, a school community meeting, known as the School Performance Appraisal Meeting (SPAM) is held where the results are presented. Community members are afforded an opportunity to engage each educator about the results after results for each class are presented (Maluleke, 2015). The community members during that session point out problems that they may see and indicate how they feel those problems should be addressed. Educators are also given the chance to respond to the concerns of the community. However, these discussions often become too personal between educators and community members, even though this process enables districts to hold schools accountable for learner achievement results. Prew and Quaigrain (2010) believe that the SPAM ensures that educators and school principals become aware that the community is

observing school performance. Another meeting follows the SPAM meeting at circuit level, which is about planning and reflection and that is where the performances of different schools within a circuit are compared. Plans are made for support, action and training of the schools that underperformed (did not perform well) during that meeting. It is during this meeting that the circuit-integrated plan is developed, and the circuit supervisor discusses with the school principals, subject advisors, educators as well as management committee chairs of the underperforming schools that. The district director holds a meeting at district level and during that meeting, the district reflects on the circuit's learner achievement results of Mathematics and schools, which then lead to the development of an integrated plan for the district.

The final public meeting is held where the performance of the schools is discussed by all the stakeholders with the aim of enabling the politicians to take proper steps in assisting and supporting schools. The following stakeholders are in attendance at this public meeting: community leaders, NGOs, religious authorities, school principals, district political and traditional leadership, senior staff from the district offices, district managers, circuit supervisors and school management committee chairs. As claimed by Prew and Quaigrain (2010), these meetings do not only make schools accountable, but they also ensure that all stakeholders are informed about overall learner achievement results in schools as well as engaging the subject advisors in improving learner achievement results (Collier *et al.*, 2002).

### **2.8.1 The Key Roles and Responsibilities of Subject Advisors**

Subject advisors have worked with schools in improving learner achievement results after the introduction of No Child Left behind Act of 2001 in the United States of America (OECD, 2011; Stein and Spillane, 2005). This act ensures that subject advisors use the data from the schools to monitor the progress of learners and enhance curriculum leadership in schools. In the USA, a study, which was conducted by the Rand Education (2005) in three urban districts, had the following broad questions about subject advisors: What strategies did subject advisors use to promote effective curriculum leadership? How did these strategies work? What enabled or constrained subject advisors' curriculum leadership role? (Gabbard, 2012). This study revealed that curriculum leadership does not only focus on subject advisors and educators, but also on school principals. Subject advisors (subject

experts) had four target areas: building the curriculum leadership skills of the school principals, giving support to the professional development of educators, providing clear guidelines and support for the standards-aligned curriculum and encouraging the use of data to make decisions concerning effective teaching and learning of Mathematics. Therefore, this means that school principals are supported in promoting effective teaching and learning of Mathematics in their schools. Effective teaching and learning are monitored easily if educators are given the scope and content that must be taught at a time. As advocated by the Organisation for Economic Co-operation and Development (OECD) (2011), the use of standardised tests at district level also provides immediate feedback about teaching and learning of Mathematics in schools.

Subject advisors oversee a subject or phase, either the General Education Training (GET), Senior, or Further Education and Training (FET) phase. Subject advisors ensure that effective teaching and learning of Mathematics takes place at secondary schools by providing and coordinating guidance and direction on the latest ideas, concepts or skills relating to approaches to the subject, subject methodology, techniques and evaluation, and assist and convey these directions to HoDs, educators and learners in an effective manner. Subject advisors should cooperate with school principals, deputy principals, HoDs, educators and learners in order to promote effective teaching and learning of Mathematics (Christou et al, 2004). Subject advisors must foster administrative efficiency and effectiveness in provinces, districts and schools. Subject advisors are also expected to participate on agreed upon provincial, district or school educator appraisal processes, and review educators' classroom practices regularly with the intention of improving the quality of teaching and learning of Mathematics, which, in turn, would influence learner achievement results, as claimed by Umekubo (2012).

Subject advisors have the responsibility of providing guidance and direction to subjects, phases and departments. Furthermore, subject advisors assist HoDs and educators with the interpretation of Mathematics curriculum reform policies. They demonstrate the teaching and learning of challenging topics to HoDs, educators and learners (DoE, 2000). Harris (2008) claims that subject advisors have a direct influence on effective teaching and learning of Mathematics.

Furthermore, subject advisors are required to lead developmental support groups (DSG) during the appraisal process (Verger, Altinyelken & Koning, 2013). The duties and responsibilities of DSGs include mentoring, giving support to learners, educators and HoDs, assisting educators and HoDs in the development of their personal growth plans (PGP), conducting the diagnostic assessment of educators and HoDs for professional growth purposes and doing summative evaluation at the end of the year for measuring performance. Monyatsi (2006) states that it is expected of subject advisors to provide HoDs, educators and learners with feedback, and to set targets for learner achievement in schools. These duties and responsibilities make up subject leadership.

In the UK, four key areas of subject leadership are prescribed by the Teacher Training Agency (TTA), and these are the strategic direction and development of the subject, managing HoDs, educators, and learners and leading, efficient and effective deployment of educators and resources (Harris & Muijs, 2004). To ensure strategic development of the subject, subject advisors are expected to ensure the implementation of Mathematics curriculum reform policies and practices reflecting the schools' mission of high achievement, and to promote effective teaching and learning of Mathematics. Subject advisors need to analyse learner achievement results in order to identify learners, educators and HoDs who are performing poorly, and propose solutions to assist and support learners, educators and HoDs, to improve learner achievement in Mathematics (Bolam, McMahon, Pocklington & Weindling, 1994). Subject advisors are responsible for ensuring that there is curriculum coverage by HoDs and educators and progression of all learners in Mathematics. They are expected to ensure that HoDs and educators have a clear understanding of the Mathematics curriculum reform policies, and the objectives of their lessons, as well as HoD and educators' ability to impart knowledge to learners (Mwakapenda, 2008). Subject advisors, in leading and managing HoDs and educators, are expected to help educators and HoDs to develop and maintain positive working relationships with learners, parents and the community. They are expected to demonstrate teaching of challenging topics to HoDs and educators and use that as an opportunity to develop HoDs and educators professionally. Subject advisors are expected to assess the training needs of learners, educators and HoDs

and provide support through coaching, mentoring and outsourcing external expertise (Koh *et al.*, 2011).

In order to ensure efficient and effective deployment of educators, HoDs and resources, subject advisors are responsible for determining staff and resource needs for the subjects under their supervision, and to advise senior management on ways to prioritise Mathematics teaching and learning effectively and to meet the department or school's objectives efficiently. Subject advisors are also expected to deploy or advise school principals and HoDs on the deployment of educators in the subject (Bolam, McMahon, Pocklington & Weindling, 1994).

### **2.8.2 Support offered to Educators by Subject Advisors**

The subject advisor must draw up a support and enrichment plan for all schools or educators under his or her authority based on learner achievement results at the end of the year. The enrichment and support plan must also be informed by what schools plan to do to address their challenges, as reflected in their School Improvement Plan (SIP) or Academic Performance Improvement Plan (APIP).

The subject advisors visit schools at the beginning of each year to discuss the previous year's learner achievement results as well as ensuring that all necessary resources for effective teaching and learning are available (MacBeath & Myers, 1999; Dunmock and Walker, 2000). They are also supposed to write subject letters to schools, HoDs and educators reflecting on the previous years' learner achievement results and ensure the availability of the necessary Learner Teacher Support Material (LTSM). Besides this, subject advisors are required to organise meetings as well as assess the capacity of all new educators paying special attention to newly qualified educators (Harris & Muijs, 2004). Furthermore, they are expected to organise orientation meetings/workshops with HODs, school principals and new educators for the following academic year, including setting targets, agreeing on monitoring, evaluation and support strategy for the district as well as discussing strategies for improving learner achievement results in Mathematics (Yamasaki, 2016).

In the second and third quarters of the academic year, the core responsibility of subject advisors is to conduct school visits focusing on schools that have demonstrated a decline of learner achievement results in Mathematics in end of year

results (Grade 12 or Annual National Assessments). Schools that are serial underperformers are stipulated by subject advisors to establish a realistic course of action to improve teaching and learning of Mathematics. The subject advisor is also expected to engage educators and HoDs on their academic improvement plans for their subjects, including educator professional development plans. Moreover, they are supposed to check that educators have all the necessary support material for example textbooks, examination guidelines, content frameworks, past examination papers and memoranda training materials on content, exemplar papers and memoranda as well as moderating formal assessment tasks (OECD, 2011; Sampson and Austin, 2011). They are expected to undertake face moderation in subjects that have a practical component or orals. Another point is that subject advisors are expected to advise schools on procurement of resources such as equipment, chemicals and cooking items for hospitality studies. Drawing samples of learners' written work to establish pace, depth as well as sequencing curriculum coverage, comparing written work, educator planning as well as resources availability should comprise subject advisors aims of school visits. They are expected to check frequency and management of home and class work, usefulness of feedback to improve learner understanding, assessing strategies to pick up learner challenges and school systems to provide remedial lessons or additional support to learners needing it. They are expected to conduct capacity building training for educators in areas where professional development support is needed, supporting the formation of a cluster of schools with similar or common challenges to promote working cooperation and sharing of best practices among educators. According to Mokhele (2011) and DBE (2018), onsite support school visits to all schools, including the ones in remote areas must be mandatory to all subject advisors. This helps to improve curriculum leadership role of subject advisors' role in improving Mathematics performance in South African secondary schools, as claimed by Kalawole (2012).

### **2.8.3 Challenges Encountered by Subject Advisors in Executing Their Curriculum Leadership Role**

Subject advisors exist in terms of the laws of different countries in the African continent; however, there are problems in these countries, which affect the curriculum leadership role of subject advisors. These problems include transport or

in some cases, it is the human resource and resources, which may be funding (Jita and Mokhele, 2014).

The department of basic education in Botswana has a section, which is called the department of inspection and field services, which is tasked with the maintaining as well as improving professionalism and learner achievement results (Moswela, 2010). These officers initially served schools from a central office but could not supervise curriculum leadership in all schools due to isolation, remoteness of schools and standards of roads. It was recommended through the 1977 National Commission on education that this service of curriculum leadership should be strengthened through working closer with schools, so that they could assist in the teaching and learner learning in the classrooms. Field officers are subject specialists and their functions include school visits, instructional leadership in schools, monitoring learner achievement results, issues pertaining to the delivery of good and quality education, assisting educators in improving instructional leadership through workshops and advising schools on best practices as well as maintaining of academic standards. As previously mentioned, subject advisors in Botswana are challenged with carrying out that role of instructional leadership because some schools are remote, isolated and they continue to increase and in addition, they are also not able to spend enough time in each school to be effective. School principals meanwhile are not obliged by the law to supervise curriculum leadership, unlike in the USA where school principals are at the centre of curriculum leadership through No Child Left Behind Act of 2001 (Hammond et al, 2009; International Reading Association, 2004). The good intention as well as the education policies from various African countries is affected by problems, which continue to prevail.

Wanzare (2011) claims that in Kenya, the Education Act Cap 211 of 1968 gives the minister of education the power to promote the education of the people of Kenya. The directorate of quality assurance and standards arranges for school visits by quality assurance and standards governing officers to supervise secondary schools. These school visits include assessing educator competency through classroom observations and checking on educational standards of schools. Through school visits, these officers may see a need for workshopping both educators and school principals. In Kenya, despite this, curriculum leadership has been neglected because of implementation challenges. These problems include limited resources like funds

and equipment, lack of meaningful feedback to schools, lack of transport, shortage of personnel as well as personnel lacking instructional supervision. These challenges have made policy makers in Kenya make the call for internal instructional supervision because they perceive subject advisors as not assisting schools in curriculum leadership. In most countries in African countries, the subject advisors visit schools and conduct class visits, monitor the performance of learners as well as conduct educator-training workshops. As in South Africa and Senegal, the subject advisors visit schools for different duties, but they also have subject advisors serving as mentors. These subject advisors provide in-service training for shorter or longer periods. A school principal may request a subject advisor to come and work at his or her school in order to assist and support Mathematics educators. Subject advisors may be stationed in one school or may rotate amongst schools depending on school needs, as pointed out by Glassman and Sullivan (2006). However, in South Africa, subject advisors rotate among schools.

In Senegal, the subject advisors are also able to work with educators in schools thereby obtaining information easily about educators' challenges. As educators do not only get assistance during workshops, but on daily basis, that can quickly improve quality teaching and learning of Mathematics. In addition, this is helpful to educators who are new in the field and when there are changes in the curriculum as educators may not only be offered development but also their performance can be monitored (Hord, Rutherford, Huling-Austin & Hall 1987), and the challenges can easily be identified and solved (Vanderburg & Stephens, 2010).

The supervision of schools in Nigeria can be traced back as far as 1882 during the introduction of education ordinance, as claimed by Kalawole (2012). The education ordinance enabled the establishment of a general board of education whose function it was to appoint an inspector for schools in West Africa. The education ordinance was viewed as a way of controlling the development and growth of schools. According to Kalawole (2012), in 2004, the National Policy on Education was introduced which states that one of the main objectives of education administration was to ensure control through continuous supervision of instruction and inspection. It is crucial to note that Kalawole (2012), points to the concerns which have been raised by Williams (2010) as well as Huggins, Scheurich and Morgan (2011) such as the falling standard of learning and the increased recruitment of unqualified

educators. They further indicated that inspection reports are not made available to educators on time, no follow-ups on identified challenges usually identified during visits are made and visit to schools by inspectors are, in most cases, rare. The above three authors view subject advisors' curriculum leadership role as pivotal in improving learner achievement results in Mathematics. However, in South Africa, challenges encountered by subject advisors in executing their curriculum leadership role are not clear and hence the current study sought to close this gap.

## **2.9 THE IMPLEMENTATION PRACTICES OF MATHEMATICS SUBJECT ADVISORS' CURRICULUM LEADERSHIP**

It is important to understand the reforms which take place at district level as they do not only affect school performance, but they also affect the roles as well as responsibilities of subject advisors as curriculum leaders. Some of the reforms are based on research findings such as Wenger *et al.* (2002), Whitby (2010) and Bush *et al.* (2010), which then necessitate redefining the curriculum leadership role of subject advisors. The findings of different studies which were conducted by different scholars such as Jepketer *et al.* (2015) on the relationship between district reforms and school performance, has revealed many factors. The factors identified were strong curriculum leadership, system focus on learner achievement and consistency of instruction, district-guided curriculum as well as aligned assessment, shared vision and responsibility, balance of district support and control, climate of urgency, and frequent monitoring and use of data for decision making, coherent professional development, collegiality and respect, overhaul of district practices, classroom focus targeted interventions as well as involvement of multiple stakeholders (Highfield, 2010). The current study only concentrated on five of the above factors which include strong instructional leadership, system focus on achievement and consistency of instruction, coherent professional development and district-guided curriculum as well as aligned assessment and collegiality and respect in redefining the role of subject advisors in the educational fraternity.

### **2.9.1 Strong Instructional Leadership**

Strong instructional leadership is characterised by consistent monitoring, supervising, controlling, evaluating, supporting, coaching and giving immediate feedback to educators (Hord *et al.*, 1987). When subject advisors provide

coordinated and systematic support that improves effective teaching and learning not only at individual schools but also across the district, learner achievement results improve significantly, as advocated by Johnson (2008). For learner achievement results to improve, it needs strong curriculum leadership. Studies conducted by Hallinger (2012), Nakum (2011), Odhiambo and Hii (2012) and Mwakapenda (2008) as well as Maphosa *et al.* (2013) indicate the positive influence of strong instructional leadership on improving teaching and learning of Mathematics.

### **2.9.2 System Focus on Learner Achievement and Consistency of Instruction**

System focus on learner achievement and consistency of instruction implies adopting the teach-and-assess strategy as well as target setting. Learners are given frequent informal tests and the results are analysed to determine the impact of teaching and learning. From the analysis of learner achievement results, strategies are developed in keeping and promoting good classroom practices that has a positive influence on learner achievement results. A study conducted by Anderson (2012), points out characteristics of districts, which were focused on improving learner achievement results. The study identified districts as having a vision, which was focused on learner learning and instructional improvement.

Highfield (2010) concurs with Anderson (2012), as they, in their study, point those districts that are effective focus on curriculum as well as instructional improvement. A study conducted by Ng *et al.* (2015) in Singapore, established that subject advisors had coherent focus on teaching and learning. However, in South Africa, it is not clear as to whether Mathematics subject advisors have got a system focus on learner achievement as well as the consistency of instruction or not and hence the present study attempted to close this gap.

### **2.9.3 Coherent Professional Development**

Naicker, Chikoko and Mthinyane (2013) also noted that in improving teaching and learning of Mathematics, subject advisors used an aligned method for professional development. Educator professional development had to be aligned with district goals, so that the vision of the district could be translated in the classrooms (Anderson 2012). The current study aimed at establishing whether an aligned method for professional development, as indicated in Anderson's (2012) study, could be applicable here in South Africa.

Supporting educators through professional development by subject advisors is crucial in promoting effective teaching and learning of Mathematics, as advocated by Chrispeels and Pollock (1989), Tsetetsi and Mahlomaholo (2015) as well as Odhiambo and Hii (2012). The studies of these researchers are supported by the research, which was done by Darling-Hammond *et al.* (2006) which points out the importance of educators and principals' professional development, which in turn influences learner achievement results in Mathematics.

Cravens, Liu and Grogon (2010) claim that in China, unlike in the western countries, the education system is the main duty of the national government and the roles of superintendents, appointed by the government, are within the framework of the central government. As it deals with the holistic development of the learners, quality-oriented education, which started in the 1980s, has identified challenges in the curriculum leadership role of subject advisors (superintendents). Developing learners socially, spiritually, physically and academically comprises the holistic development of learners. These reforms also include the local control of curriculum planning, educator training, community building as well as financial management. As maintained by Cravens *et al.* (2012), the need for strong and competent subject advisors is crucial in China, so that they are able to face these reforms. Hence, in China, learner achievement in Mathematics is among the best countries in the world. It is therefore imperative to understand the Chinese education system, in order to understand the curriculum leadership role of subject advisors for Mathematics improvement in South Africa.

The responsibilities of subject advisors are based on those rules, which apply to civil servants according to Cravens *et al.* (2012). The government personnel policies state that the subject advisors' main role is to follow the instruction from the regional and provincial government office, as pointed out by Bak (2010). These subject advisors who come from that background are now expected to implement quality-oriented education reforms. The government has also introduced system-wide curriculum reform and site-based management in order to implement the quality-oriented system education. These reforms include relating to real life contexts, encouraging hands-on experiences and project-based content and offering more options to learners in terms of subject choices. The superintendents are the ones who must enhance curriculum leadership at the level of the school; however, these

reforms pose more challenges than providing them with the necessary tools for effective teaching and learning of Mathematics in secondary schools.

These reforms promote autonomy as well as accountability, but in China, subject advisors' curriculum leadership is not a familiar concept. Different studies, which have been conducted show that educational officials tend to perceive schools as the extension of the government, so they use a top-down approach, as advocated by Cravens *et al.* (2012). These officials do not focus on child-centred learning or interacting with school principals or educators because the positions that they occupy give them power. They focus more on their seniority that will enable them to get higher positions and there is nothing motivating them to gain more knowledge, so they do not support effective teaching and learning of Mathematics fully.

In order to define the roles and responsibilities of superintendents, it is worth noting that Chinese are slowly focusing on theories of the western countries. They are thus searching for varied ways that can promote and improve subject advisors' curriculum leadership role. Umekubo (2012) points out that in 1993, the American Association of School Administrators introduced eight professional standards for a subject advisor. The standards address the problems, which are presently facing China, which means that they must professionalise the superintendent's curriculum leadership role as well as know exactly what is expected of a person occupying the superintendent position. These standards are leadership and district culture, communications and community relations, policy and governance, curriculum planning and development, organisational management, instructional management, values and ethics of leadership as well as human resources management. Each standard has a corresponding indicator stating the expectations of a superintendent. The curriculum reforms and changes taking place in China point to the importance of subject advisors' curriculum leadership role, which is viewed as a way of improving learner achievement results in Mathematics. However, in South Africa little is known about how subject advisors' curriculum leadership is practised as well as the policy or regulatory framework that serves as a guide.

Dimmock and Tan (2012) claim that in Singapore, the education system is one of the smallest in the world and yet learner achievement results in Mathematics are one of the highest. In Singapore, the system of education, which is very regulated and

centralised, is positively impact by the curriculum leadership role of subject advisors. It is worth discussing the ways, which are used in Singapore, which contributes to improved learner achievement results in Mathematics through enhancing as well as promoting subject advisors' curriculum leadership role. These ways are appraisal and monitoring, leadership career track, estimates of leadership potential and ranking of offices, rotation of school principals and the cluster system, leadership preparation and development as well as the curriculum leadership role of superintendents (Ng *et al.*, 2015), which are discussed in the next paragraphs.

#### **2.9.4 Appraisal and Monitoring**

Educators are monitored continuously by subject advisors and appraisal is done throughout educators' career path. Information must be provided to the district offices by a reporting officer (school principal) concerning educators' strengths and weaknesses throughout the year and educators are also given support, as maintained by Collier *et al.* (2002).

#### **2.9.5 The Leadership Career Track**

The personnel in the education system have three varied career paths available for them, namely teaching, specialist and leadership. An individual selects the path of leadership, but an individual is approached to take leadership position through the process of monitoring and selection depending on the willingness of that person (Aipinge, 2007).

#### **2.9.6 Estimates of leadership potential and ranking of offices**

Educators are ranked after each round of appraisal. The panel consists of the school principal, deputy principal and the subject HoD and the district superintendent (subject advisor) becomes the moderator of all district schools. Educators can be considered for performance bonuses and promotions after the ranking, if they have met the requirements of the expected performance (Jones, 2009). This system is similar to the one used in South Africa, the Integrated Quality Management Systems (IQMS). As stated by the Resolutions 8 of (2003), to be considered for promotion, the decision is based on the educators' performance, knowledge, experience and potential, readiness to perform at a higher level as well as the availability of vacancies.

### **2.9.7 Rotation of school principals**

The school principal and deputy principals are rotated between five to seven years. This is done in order to enrich their management skills and leadership experiences. The principals and deputy principals can also be rotated as district superintendent or assistant or deputy directors in different offices which are expected to promote effective teaching and learning of Mathematics in schools through improving personnel's curriculum leadership practices (Hallinger, 2012; Waldron, 2010).

### **2.9.8 Leadership preparation and development**

Educators in the path of leadership may go for either the HoD position or deputy principal position. The educators get training to prepare them for those positions (Tatana, 2014).

## **2.10 CHAPTER SUMMARY**

The main purpose of the literature review on subject advisors' curriculum leadership was to establish key elements that have significant impact on Mathematics improvement in South African secondary schools. The chapter outlined the cognitive theory, York-Barr and Duke educator leadership model as well as Angella and DeHart Model of supporting schools as the theoretical frameworks underpinning this study. The use of York-Barr and Duke (2004) as well as Angella and Dehart (2011) as conceptual frameworks for this study was chosen by the researcher in the sense that the kind of learning opportunities created by subject advisors as leaders of the curriculum in educators' classroom practices has the potential to either enhance or hinder learner achievement results in South African secondary schools. This was followed by presenting the conceptual framework of the study as well as the justifications as to why the conceptual framework is used a lens to investigate the curriculum leadership role of Mathematics subject advisors.

In this study, the historical review of the curriculum leadership role of subject advisors in general and in relation to learner achievement in Mathematics was done and presented first in a manner that justifies the value of this study. This was followed by a discussion of the concept curriculum leadership and cognitive theory as well as the conceptualisation of this theory to suit the current study. The literature reviewed sensitised the researcher to the relevant content in the literature. The class as well

as context of curriculum leadership of subject advisors for Mathematics improvement as skills development in education systems has been outlined as well as the roles played by Mathematics subject advisors particularly in relation to educator support which influences learner achievement results has been dealt with in this chapter. The research findings are later related to the existing knowledge in the literature to support Mathematics subject advisors' curriculum leadership role and the manner it influences learner achievement results.

## CHAPTER 3

### RESEARCH METHODOLOGY

#### 3.1 INTRODUCTION

Cognitive theory, as outlined by Spillane (2000), York-Barr and Duke's (2004) educator leadership model as well as Angelle and DeHart's (2011) model of supporting schools relating to the theoretical framework and the use of a conceptual framework was discussed in the previous chapter. Chapter 2 also reviewed international and national literature on the curriculum leadership role of subject advisors and the manner in which it influences educators' classroom practices. This was done with the aim of understanding how subject advisors' curriculum leadership is practised in South African secondary schools and the impact thereof. Chapter 3 covers an overview of the methodology used in this study for the exploration of Mathematics subject advisors' curriculum leadership role in secondary schools of the Free State in South Africa. The chapter further provides a description and justification of the research methodology selected to answer the research question *How do subject advisors understand their curriculum leadership roles for Mathematics improvement in South Africa?* and the sub-questions:

1. What is the policy and/or regulatory framework that guides and or regulates the functions of subject advisors in curriculum leadership and support in South Africa?
2. How do subject advisors, across a variety of contexts in South Africa, understand and go about implementing their roles in curriculum leadership and support for the improvement of Mathematics instruction?
3. How can we construct a theoretically sound account to explain the understandings and implementation practices of Mathematics subject advisors in South Africa?

The aim of this study was twofold: firstly, the study aimed to explore curriculum leadership role of Mathematics subject advisors for Mathematics improvement in South African secondary schools. Secondly, the study sought to explore how the cognitive framework as well as York-Barr and Duke (2004) and Angelle and DeHart (2011) concepts of educator leadership could develop an understanding of

Mathematics subject advisors' curriculum leadership practices in South African secondary schools.

Methodology is defined by Maree (2007) as ways of gathering, organising, and interpreting as well as data analysis. Decisions on methodology to be used in a particular study depend on the nature of the research question posed. Methodology in research can be considered as the theory of correct scientific decisions, as stated by Yin (2011). The discussion of this chapter outlines the research design, population, sampling, data collection as well as data analysis. Measures to provide trustworthiness as well as ethical issues are also discussed.

### **3.2 RESEARCH DESIGN AND METHODOLOGY**

The research methodology used in this study was a qualitative and for the purpose of this study, the phenomenological method was adopted. Speziale and Carpenter (2003:55) define phenomenology as “a science whose purpose is to describe particular phenomena or the appearance of things as experiences that are lived”. Phenomenological research methodology is however difficult to explain since it has no steps that are clearly defined. Burns and Grove (2003) claim that phenomenologists are of the opinion that the clear definition of methodology tends to limit the creativity and innovativeness of researchers.

### **3.3 RESEARCH PARADIGM**

According to Denzin and Lincoln (2005:245), a paradigm is “a set of beliefs that guide action”. This study was conducted within the interpretive paradigm, which operates from the assumption that knowledge can be constructed and that there are multiple realities that can be determined from any situation that is given (Cohen, Manion & Morrison, 2011). According to Maree (2007:58):

*Interpretivism has its roots in hermeneutics, the study of the theory and practice of interpretation. It developed in the 19th century as a philosophical theory of meaning and understanding, and also of literary interpretation.*

From the original conception of interpretivism, a number of different interpretive approaches developed, namely critical theory, phenomenology, and constructivism.

The idea of constructivism originated from Mannheim and from works of writers such as Berger and Luekmann's *the social construction of reality* (1967) as well as Lincoln and Guba's *Naturalistic inquiry* (1985). Social constructivism is rooted in the belief "that individuals seek to understand the world in which they live and work" (Maree, 2007: 59). Creswell (2013:32) also points out that ...

*individuals develop subjective meanings of their experiences – meanings directed toward certain objects or things. These meanings vary from individual to individual and are multiple, leading the researcher to look for the complexity of views rather than narrowing meanings into a few categories or ideas.*

The aim of the researcher was "to uncover the participants' views of the situation being studied" (Creswell, 2013:38). A common trend with interpretive researchers is that they start assuming, "that access to reality is only through social constructions such as language (including text and symbols), consciousness as well as shared meanings", as claimed by Maree (2007:59).

Interpretive studies attempt to provide a better understanding of natural events because of the meanings that individuals assign to them. The interpretivist paradigm is suitable for this study because of its characteristics, which include that we can only understand human life from the inside. The focus is on human experiences, the way people build and share meanings and their interrelationships and interactions. In studying curriculum leadership, research techniques were used to help understand how subject advisors interpret Mathematics curriculum policies and the manner subject advisors interact within their social environment in their practice of leadership for Mathematics at schools. Secondly, social life is a distinctively human product. Interpretivists assume that reality is not objectively determined, but instead, it is socially constructed. The underlying assumption is that by placing subject advisors in their social contexts, there is a greater opportunity to understand the perceptions they have of their own activities, as advised by Silverman (2005).

Thirdly, "the human mind is the purposive source of meaning" (Yin, 2011:54). An in-depth exploration of the complexity of subject advisors' Mathematics curriculum leadership enables us to begin developing an understanding of the manner in which subject advisors assign meaning to Mathematics curriculum policies. Knowing how

subject advisors assign and build meaning from Mathematics curriculum policies enables us to get a clear, better picture of subject advisors' curriculum leadership role. In the fourth place, "human behaviour is affected by knowledge of the social world" (Maree, 2007:59). Interpretivists suggest varieties of reality, as opposed to a single reality of subject advisors' curriculum leadership and the fact that reality varies from place to place and from time to time. An increase in our knowledge and the way we understand the social environment and the realities being built by subject advisors, enrich our exploration of the curriculum leadership role of subject advisors in secondary schools.

Through this paradigm, the researcher ascertained the different perspectives and different realities of the participants regarding subject advisors' curriculum leadership role of Mathematics in the Free State of South Africa. Utilising this paradigm enabled the researcher to interpret data based on the subject advisors' as well as educators' perspectives.

### **3.3 RESEARCH APPROACH**

Creswell (2013:27) highlights three approaches that researchers can use, namely qualitative, or quantitative and mixed methods. Yin (2011:58) claims that, "the three approaches are not as discrete as they first appear". Bowen (2008:12), views "qualitative and quantitative approaches as not rigid, distinct categories". Studies may tend to be more qualitative than quantitative or more quantitative than qualitative. Studies utilising mixed methods lie in the middle of this continuum due to the incorporation of qualitative and quantitative approaches. The central assumption of mixed methods is that the sum of qualitative and quantitative approaches provides a more complete understanding of a research problem than either approach alone (Creswell, 2013).

According to Maree (2007:78), "qualitative research is an approach for exploring and understanding the meanings individuals or groups ascribe to a social or human problem". This study used a qualitative approach. Data were collected in the subject advisors and educators' settings (schools and educator workshops), data analysis inductively built from specifics to general themes and the meaning of the data was interpreted. In this study, the researcher supported a way of looking at research that honours an inductive style, focusing on individual meaning and the importance of

representing the complexity of curriculum leadership by Mathematics subject advisors' in South African secondary schools, as claimed by Yin (2011).

The study utilised qualitative methods to investigate the first, second and third research questions in attempting to understand the curriculum leadership role of mathematics subject advisors as well as the manner in which it influences learner achievement results in Mathematics. The researcher engaged participants in attempting to construct realities from the viewpoint and perception of participants. Participants thus gave an interpretation of what is entailed by the curriculum leadership role of mathematics subject advisors and in the final data analysis participants' understanding of the curriculum leadership role of subject advisors and the researchers' interpretation of them were used to construct multiple realities of the manner in which subject advisors' curriculum leadership can be explained and understood better.

According to Creswell (2013:132),

*qualitative research is interpretative research; the researcher is typically involved in a sustained and intensive experience with participants. This introduces a range of strategic, ethical and personal issues into the qualitative research process.*

With these concerns in mind, researchers

*explicitly identify reflexively their biases, values and personal background, such as gender, culture and socioeconomic status that shape the interpretations formed during research* (Locke, Spirduso & Silverman, 2013:81).

In order to obtain an in-depth understanding of subject advisors' curriculum leadership role in secondary schools and the sense that they construct regarding Mathematics reform policies, I opted for a qualitative rather than a quantitative approach in order to obtain an in depth understanding of the manner subject advisors' curriculum leadership was being practised and the sense that they construct concerning Mathematics reform policies. Qualitative research refers to inductive, emic, holistic, process oriented as well as subjective methods used to understand, describe, interpret and develop a theory on a setting or phenomena (Guba & Lincoln, 2005). Burns and Grove (2003) claim that it is a systematic,

subjective approach used to describe life experiences as well as giving them meaning. Qualitative research is mostly associated with language, words and experiences as opposed to measurements, numerical figures and statistics. Researchers using a qualitative approach adapt person-centred and holistic perspectives to understand human experiences without concentrating on specific concepts. The original context of the experiences is unique, and rich insight and knowledge can be generated in depth to portray a lively picture of the participants' reality and social context. As claimed by Johnson, Onwuegbuzie and Turner (2007) these circumstances and events are important to the researcher.

Qualitative research is characterised as developmental and dynamic regarding the generation of knowledge and does not use formal structured instruments, as claimed by Maree (2007:54). In addition, qualitative research involves the systematic collection as well as the analysis of subjective narrative data in an organised and intuitive fashion to identify the characteristics and the significance of human experiences as pointed out by Johnson *et al.* (2007). Researchers doing qualitative research are concerned with the emic perspective of exploring the ideas, perceptions, beliefs, values, understanding and concerns (Yin, 2011) of Mathematics subject advisors' curriculum leadership role. The researcher examined subject advisors' curriculum leadership role from both Mathematics subject advisors and educators' perspective with the hope of getting detailed knowledge and understanding of their current practices. The researcher therefore became involved and immersed in the exploration of Mathematics subject advisors' curriculum leadership role. The immersion of the researcher helped to provide dense as well as thick descriptions from the narrative data that were gathered from the participants, to interpret and portray Mathematics subject advisors' experiences, perceptions, beliefs, ideas, concerns as well as generating empathetic and experiential understanding. Immersion however, cannot be obtained without a researcher-participant trusting relationship, and this relationship was built through basic interpersonal and interviewing skills (Minichiello & Kotler, 2010).

### **3.3.1 Attributes of Qualitative Research**

Willis (2007:15) maintains that qualitative research adopts a holistic and person-centred perspective as well as developing an understanding of individuals' ideas

concerning their lives and the lives of other people. Furthermore, Johnson and Onwuegbuzie (2004) claim that qualitative research helps the researcher generate an in-depth account that will present a lively picture of the research participants' reality. The researcher in qualitative research is required to be non-judgmental, flexible, a good listener, friendly and honest, as advocated by Yin (2011). According to Maree (2007), qualitative research is a form of content analysis covering a spectrum of approaches ranging from hermeneutical-phenomenological psychology to empirical phenomenological psychology determined by the source of the data.

Special characteristics of qualitative research are that it uses an inductive form of reasoning, insights, understanding and reasoning from data patterns. Secondly, qualitative research derives meaning from the participants and uses the emic perspective of enquiry (Schwandt, 2000). Thirdly, qualitative research aims to understand the meaning that people attach to everyday life and it is ideographic. Besides this, it regards reality as subjective and captures as well as discovers meaning once the researcher becomes immersed in the data. Moreover, it uses concepts in the form of themes, motifs and categories and seeks to understand phenomena (Johnson *et al.*, 2007). Furthermore, qualitative research determines observations by information richness of settings, modifies types of observations to enrich understanding as well as presenting data in the form of words, quotes from documents and transcripts. In addition, it uses words as the basis for analysis rather than numerical data as well as considering that the whole is always more than the sum, as claimed by Burns and Grove (2003).

### **3.3.2 Indication for using Qualitative Research**

According to Creswell (2014), qualitative research is a tool with which researchers can examine the context of existing views that are regimented or gestalt. As advocated by Burns and Grove (2003:20), the concept of holism is closely related to gestalt and the view proposes that knowledge about a particular phenomenon is organised into a cluster of linked ideas explaining a phenomenon. The qualitative research approach aims at forming new gestalts in order to generate new theories and it is crucial that the researcher is open to new gestalts (perceptions) being formed from information received during the process of research. The significance of human experience and the identification of characteristics, as described by

participants and interpreted by the researcher at various levels of abstractions, are achieved through qualitative research (Ellis et al., 2007). The researchers' interpretations in qualitative research are inter-subjective, that is, another person can come to similar interpretations given the researcher's frame of reference. Through the researchers' creative abstractions, qualitative data can be processed and the participants' descriptions studied to uncover the meaning of Mathematics subject advisors' curriculum leadership experiences in leading the teaching and learning of Mathematics in South African secondary schools. According Locke, Spirduso and Silverman (2013), the general reasons for conducting qualitative research are hypothesis generating and description. Description is done when little is known about the phenomenon under study, hence little is known about the experiences and perceptions of Mathematics subject advisors' curriculum leadership role. Hypothesis generation is done when the researchers' qualitative research does not have a prior hypothesis and qualitative inquiry might however, elicit appropriate hypothesis (Van der Wal, 1999:56). In this study of the exploration of Mathematics subject advisors' curriculum leadership role, there was no hypothesis and the study was only guided by a research question.

### **3.3.3 Advantages and Disadvantages of Qualitative Research**

Firstly, qualitative research is a means to understanding human emotions, experiences such as caring, anger, pain, effort and rejection. Secondly, since human emotions, feelings, experiences and perceptions are difficult to quantify, qualitative research appears to be a more effective method of investigating emotional responses than quantitative research (Bochner & Ellis, 2006). Moreover, it focuses on understanding the whole, which is consistent with Mathematics subject advisors' curriculum leadership role. Fourthly, abstract thinking processes are used to develop research findings from which meaning and theoretical implications emerge. Fifthly, the research design is flexible and unique throughout the research process, as advocated by Burns and Grove (2003).

Pavlenko (2007) asserts that one of the main advantages of qualitative research is that it gives access into participants' private worlds and provides rich and thick descriptions of data. There is also the ease of access to data since the researcher calls on her or his own experiences as the source from which to investigate a

particular phenomenon. On the other hand, Richards (2008) argues that it is this advantage that also entails a limitation by subscribing analysis to a personal narrative; the research is also limited in its conclusions. Ellis (2007:24), however, considers that this limitation on the self is not valid, since, "If culture circulates through all of us, how can qualitative research be disconnected to a world beyond the self?". The researcher believe that an important advantage of qualitative research is its potential to contribute to others' lives by making them reflect on as well as empathising with the narratives presented. Some people may become aware of realities that have not been thought before through reading social accounts, ideas, concerns and experiences of others, which makes qualitative research a useful form of inquiry (Barkhuizen & Wette, 2008; Sparker, 2005). I consider personally that any piece of research should have a beneficial goal for all the people involved. The purpose of qualitative research may be different as the topics it deals with. Writing accounts of research should always however have the goal of educating as well as informing others (Miller & Bell, 2002), which is an objective that might be accomplished through qualitative research by making associations with readers' personal concerns, experiences and concerns. Another advantage of qualitative research is that it allows the researcher to write first person accounts thereby enabling his or her voice to be heard and thus providing him or her with a transition from being an outsider to an insider in the research, as claimed by Hitchcock and Hughes (1995). Wall (2008:1724) sees qualitative research as a discourse, which is emancipatory since those being emancipated are representing themselves as opposed to being colonised by others and subjected to their agendas as well as relegated to the role of second-class citizens. Qualitative research for many represents the power and the right to express and tell the truth as experienced without necessarily waiting for others to express what they really want to be understood and known (Pavlenko, 2002).

Despite the advantages of qualitative research as a method of research mentioned above, there are also some limitations, which need to be taken into account. The feelings evoked in readers for example, may be unpleasant since the connections that readers make to narratives cannot be predicted, as claimed by Bochner and Ellis (1996). Qualitative research exposes thoughts and inner feelings, which require honesty and willingness to self-disclose, which is another challenge. This challenge

also entails many ethical questions, which sometimes may be very difficult for the researcher to answer, making qualitative research a complicated method to follow. Ellis (2007) argues that ethical considerations, one of the main features of qualitative research is its emphasis on the self and it is this specific feature that entails the problematic ethical considerations of the method. As a personal narrative is developed, the context and people interacting with the subject start to emerge in the reflexive practice (Ellis & Bochner, 2000). It is at this point when the problem of obtaining or not obtaining consent to be included in the narrative was considered by the researcher (Miller & Bell, 2002).

### **3.4 RESEARCH DESIGN**

Creswell (2013:32) defines research design as “the entire process of research based on certain design principles”. In order to explore and examine the curriculum leadership role of Mathematics subject advisors and to develop a theory around it, the generic qualitative research design was utilised. According to Denzin and Lincoln (2005:3), “in a qualitative study, researchers study things in their natural settings, in an attempt to make sense of or to interpret the phenomena in terms of the meanings people bring to them”.

A case study research design was considered appropriate for this qualitative study to provide in-depth details about the manner in which and reasons why secondary school Mathematics subject advisors’ curriculum leadership influences teaching and learning, a topic that has not received a great deal of attention from researchers. The primary interest was an examination of the curriculum leadership role of Mathematics subject advisors in secondary schools and their understanding and interpretation of Mathematics reform policies, such as CAPS, among or between subject advisors, associations with educators, learners and context, as mentioned in Chapter 1. The case study method is especially appropriate for exploring a particular phenomenon, as claimed by Maree (2007). Yin (2011) argues that a case study can be used to study a specific situation to determine if it gives rise to any general theories or to determine if existing general theories arise from specific situations. It was thus appropriate to use a case study design for this study to investigate, explore and explain subject advisors’ curriculum leadership role in South African secondary schools, as this behaviour takes place in the context of Mathematics teaching and

learning. In order for this study to lead to further inquiries intended to provide in-depth descriptions, which may, in general, add knowledge to our understanding of the curriculum leadership role of Mathematics subject advisors in subject areas other than Mathematics, I planned and designed the data collection properly.

### **3.5 POPULATION AND SAMPLING**

Burns and Grove (2003:44) define population as all elements that meet certain criteria for inclusion in a study. For this study's purpose, the population consisted of all Mathematics subject advisors and educators teaching Mathematics in secondary schools of the Free State province. A sample refers to "the whole subset of the population investigated by the researcher and whose characteristics are generalised to the entire population" (Bless & Higson-Smith, 2004:84). Purposive sampling was considered the most appropriate in this qualitative study because the researcher would be able to generalise subjectively according to personal experience (Maree, 2007). Both Leedy and Ormrod (2001:215) and Moore (2009:15) agree that purposive sampling "means that participants are selected because of some defining characteristics which make them the holders of the data needed for the research". In this study, the focus was on exploring subject advisors' curriculum leadership role in South African secondary schools and the implications this could have for the teaching and learning of Mathematics. According to Ritchie and Lewis (2003), researchers are advised to cluster the research population geographically; thus, Mathematics subject advisors and educators were selected from five districts in the Free State province, comprising 329 secondary schools, 987 mathematics educators and 21 mathematics subject advisors.

#### **3.5.1 Sampling Approach**

Purposive sampling was used to select the seven mathematics subject advisors and the ten educators based on their potential in providing thick and detailed information on how subject advisors; curriculum leadership was practised in districts, municipalities and schools. Both subject advisors and educators were selected on them having in-depth knowledge of curriculum leadership as the basis. By virtue of their posts, subject advisors and educators are the people who are directly involved in planning, implementation, monitoring, controlling and evaluating curriculum leadership activities. Three educators from three different districts were purposively

and conveniently chosen, their names having been provided by the Chief Education Specialist based on their experience in curriculum leadership activities. This selection was done with the aim of providing independent views on the manner subject advisors' curriculum leadership is constructed in schools. However, all seven mathematics subject advisors and ten educators were selected hoping to get candid information on the manner in which subject advisors' curriculum leadership was enacted in districts, municipalities and schools as well as the challenges, successes, opportunities and the manner it can be improved to improve mathematics teaching and learning.

A non-probability purposive sampling was used for this study and the participants meeting the eligibility criteria were contacted. The schools were nominated by district office heads and provincial Chief Education Specialists (CES), who have advance knowledge of Mathematics teaching and learning (Jita & Mokhele, 2013). The researcher chose participants because of a need for experts who have knowledge about Mathematics subject advisors' curriculum leadership role, as highlighted by Yin (2011: 63). Seven Mathematics subject advisors, each from each district of the Free State and 10 Mathematics educators, two from each district of the Free State were sampled for this research.

### **3.5.2 Eligibility Criteria and Site Sampling**

Locke, Spirduso and Silverman (2013) view a sample as a subset of population selected to participate in a research study. A sample defines the selected groups of elements, organisations or individuals. In this study, the sample consisted of seven Mathematics subject advisors and 10 Mathematics educators.

The participants chosen met the eligibility criteria set for the study. Creswell (2013) maintain that eligibility criteria are the reason or criteria for including the participants in a study. The eligibility criteria of this study required the Mathematics subject advisors and Mathematics educators to have been trained as leaders of the curriculum and to have worked as a curriculum leader for more than a year.

### **3.5.3 Exclusion Criteria**

All Mathematics subject advisors and Mathematics educators not working in the Free State and all Mathematics subject advisors and educators with less than a year of

working experience in curriculum leadership were excluded. The reason for exclusion was that they may not have gained enough experience of being involved as a curriculum leader (Webb 1995).

### **3.6 DATA COLLECTION**

According to Creswell (2014:75), data gathering “is the precise, systematic gathering of information relevant to the research sub-questions, through the use of methods such as focus group discussion, narratives, interviews, questionnaires, participant observation, document analysis and case histories”. As advocated by Maree (2007), the empirical stage involves the actual collection of data followed by data analysis. Data collection commenced with the researcher deciding from where and from whom data were collected, as highlighted by Wills (2007). As maintained by Speziale and Carpenter (2003:17), the researcher was the main data collecting agent. The data collected reflected giving the participants the opportunity to express their experience in curriculum leadership willingly and voluntarily.

Data collection involved visiting seven subject advisors and the ten educators in the Free State province, where the practices, roles, perceptions, ideas, concerns and understanding of Mathematics subject advisors’ curriculum leadership role were investigated. This study used interviews which gave a glimpse of the impacts of subject advisors’ curriculum leadership as well as how it influences educators’ classroom practices, which in turn influences learner achievement results in mathematics. Interviews were complemented with data obtained from observations and document analysis thereby triangulating data. Concerns such as how subject advisors’ curriculum leadership was enacted in districts, municipalities and schools as well as practices, routines, perceptions, beliefs, experiences which could not be explained well through document analysis were unpacked.

#### **3.6.1 Interviewing**

Yin (2011) views interviewing as unstructured or structured verbal communication between the researcher and the participants, in which information is presented to the researcher. According to Denzin and Lincoln (2003:45), an individual in-depth interview is defined as, “an unstructured personal interview which uses extensive

probing to get a single respondent to talk freely and to express detailed beliefs and feelings on a topic”.

The researcher interviewed participants to establish those things that could not be observed directly such as feelings, concerns, thoughts, intentions, experiences and perceptions. Interviews assisted in observing facial expressions, gestures, body language and other cues specifically when expressing feelings, attitudes, thoughts and perceptions of the curriculum leadership role of subject advisors as well as the manner in which it influences educators’ classroom practices (Creswell, 2014). They afforded the researcher an opportunity to verify the information gathered previously from document analysis and observations, thereby allowing a comparison of information emanating from document analysis and observations with information collected from interviews. In so doing, meaning was constructed on subject advisors’ curriculum leadership role and the manner it is practised in districts, municipalities and schools. Interviews were deemed appropriate in this study because of their contemporary interaction between the researcher and the participants.

The researcher utilised individual interviews that were semi-structured together with document analysis and observations as methods of collecting data for this study. The seven Mathematics subject advisors and 10 educators at the selected secondary schools were the participants in this research project. Data were collected from the participants using English as a medium of communication during the interviews. I intended to interview five Mathematics subject advisors and ten Mathematics educators teaching in secondary schools, however, during the data collection process, after I explained the importance of the curriculum leadership role of Mathematics subject advisors for Mathematics improvement in South Africa, two other Mathematics subject advisors requested to be involved in the study. When working with the Mathematics subject advisors, the researcher did not pressurise them to describe the manner in which they experience their curriculum leadership role but allowed them enough time to respond in a way that they were comfortable with (Ellis *et al.* 2007). As maintained by Brink and Wood (1998), qualitative data collection methods are unstructured, capturing verbatim reports or observable characteristics, yielding data that usually do not take numerical form as well as flexible. Unless they are transformed into some numerical system, films, words, all sensory data and art are regarded as qualitative data.

In order to realise the general aim of this study, the questioning pattern for interviews was based upon the following objectives.

- To investigate the policy and/or regulatory framework that guides and/or regulates the functions of subject advisors in curriculum leadership and support in South Africa.
- To explore the manner subject advisors, across a variety of contexts in South Africa, understand and go about implementing their roles in curriculum leadership and support for the improvement of Mathematics instruction
- To establish the manner a theoretically sound account can be constructed to explain the understandings and implementation practices of Mathematics subject advisors' curriculum leadership role in South Africa.

Through interviews, the researcher got a glimpse of the impact of subject advisors' curriculum leadership as well as how it influences educators' classroom practices, which in turn influences learner achievement results in mathematics.

#### **3.6.1.1 Advantages and disadvantages of using interviews**

Both Burns and Grove (2003) and De Vos (2006) agree that interviewing has the advantages of being a flexible technique that allows the researcher to investigate greater depth of meaning that cannot be obtained with other techniques. In addition, interpersonal skills can be used to facilitate cooperation and elicit more information. Moreover, there is a higher response rate to interviews than questionnaires (Morse, and Field, 1996), leading to a complete description of the curriculum leadership role of Mathematics subject advisors and the manner in which it influences Mathematics teaching and learning in South African secondary schools. Furthermore, interviews allowed collection of data from Mathematics subject advisors and educators unlikely or unable to complete questionnaires such as those whose writing, reading and ability to express themselves is marginal.

Greenbaum (2003) claims that individual in-depth interviews are free from group pressures structurally and in this study, they illustrated the ability to get under the surface and unpack data which is attitudinal. In addition, unique applicability circumstances especially involving personal topics or sensitive issues were managed

easily with subject advisors' and educators' interviews as well as sampling advantages including greater control over participant selection, hence more depth, flexibility and context in the process of inquiry, as advocated by Willis (2007).

In terms of the comprehensiveness of information and depth, Fern (2001) suggests that interviews give participants the opportunity to analyse the motivations for a specific practice (action) and more importantly, the uncommonness of being listened to which when coupled with the afforded anonymity which gives the participant a feeling of empowerment (Denzin & Lincoln, 2003). Specific preferential outcomes are listed by Webb (1995) and these are the possibility to ascribe the views to individual participants thereby promoting interpretation that is more precise. Secondly, it improves the quality of the data by affording participants the opportunity to build a high degree of trust and a close rapport as well as allowing easier non-conformity expression.

Greenbaum (2003) argues that the main problem of individual in-depth interviews is that they miss the advantages of interaction with other stakeholders. According to Cassell and Symon (2004), individual in-depth interviews are more challenging to interpret as a result of the sequential nature of data gathering masking an overview of consensus and Fern (2001) makes the arguments of cost and speed against individual in-depth interviews. Bowen (2009) points out those individual in-depth interviews suffer from not being an observable research technique.

Individual in-depth interviews would appear to be more suitable for research situations where there is a specific, well defined issue to investigate which calls for a detailed understanding of subject advisors 'and educators' perspectives, whereas observations and document analysis are perhaps more applicable to wide ranging exploratory research (Denzin & Lincoln, 2003).

### **3.6.1.2 The process of interviewing**

Interviewers and interviewees are strangers to each other initially and as claimed by LeVasseur (2003), interviewees tend to be uncertain, self-conscious and overly critical. Burns and Grove (2003) state that interviewers are intent on projecting themselves in a way that will evoke the least resistance in the interviewee and as first impressions are usually lasting impressions, this stage determines whether a person will agree to an interview or not. As advocated by De Vos (2002), particulars

that attest to the interviewer's credentials are important for reassuring interviewees that they are dealing with a bona fide interviewer.

The process for interview preparation starts when the researcher selects the participants according to the sampling criteria and reviewing literature (De Vos, 2002). As advocated by Willis (2007), in selecting interviewees for qualitative interviews, interviewers should enter the world of interviewees. As claimed by De Vos (2002:294), "interviews act like a needle tracking the grooves of a record". Interviewers show interest and encourage interviewees to speak by closely following the content and meaning of their verbal and non-verbal conversation. Interviewers also understand the progress of the conversation.

Interviews are usually started with a broad or general question and after the interview has begun, the role of the researcher was to encourage the participants to continue talking, using techniques such as making sounds or nodding the head that indicated interest as claimed by Burns and Grove (2003). The participants in some cases may be encouraged to elaborate further on a particular dimension of a topic under investigation by using probes. The interviewer is obliged to follow up cues during an in-depth interview in order to get the true meaning of the topic under investigation. In order to do so, the interviewer probes for more information and clarification. Probing helps to avoid biasing the participants' responses. Holloway (2005) suggests that interviewers can repeat in their words, the opinions, feelings, concerns, thoughts, beliefs, perceptions and ideas of interviewees to determine whether responses were misunderstood and for clarifying matters.

The researcher used semi-structured qualitative interviews guided by an interview schedule (Appendices E & F) and this was meant to put Mathematics subject advisors and educators at ease as they were guided through the interview by being asked open-ended questions which enabled them to talk about issues relating to the study. The participants were able to reveal relevant information in a natural way and had the opportunity to qualify their answers as well as explaining in depth the underlying meaning of their responses, as advocated by Polit and Hungler (2004). De Vos (2002:293) claims that, "open ended questions do not need a one-word answer but provide interviewees with ample opportunity to express their feelings".

This sentiment is further echoed by Creswell (2014) who argue that open-ended questions allow participants to respond in their own words.

In this adopted phenomenological research method, the researcher was the main data collection instrument. The researcher played a major role in conducting the interviews without the support of research helpers (assistants). The researcher as the initiator of the interview played an active role in making certain decisions about interview progress. In addition, throughout the interview, the researcher demonstrated sensitivity to the uniqueness of each participant and approached the Mathematics subject advisors and educators with an empathetic understanding. This behaviour was intended to create an interviewer with the following characteristics: good listener, non- judgemental, friendly, open and honest as well as flexible.

### **3.6.1.3 Conducting the interviews**

The researcher made an appointment with each participant at a time suitable for them and created a conducive environment to conversation. In this study, data were gathered by interviewing Mathematics subject advisors and Mathematics educators in a quiet environment, where they felt safe and free from disturbances. Interviews were held in Mathematics subject advisors' offices and educators' classrooms or offices. Interviews were scheduled for 50 to 60 minutes for each participant. Chairs were arranged in such a way as to enhance face-to-face interviewing.

As claimed by Willis (2007), the researcher needs to establish a cordial atmosphere so that interviewees feel secure and have the confidence to speak freely. Before conducting each interview, practical aspects of the research were mentioned with the researcher thanking each participant for the time and willingness to be part of the study as well as reminding each that the information was only needed for academic purposes and will not be divulged to anyone else (confidentiality agreement). Secondly, the researcher explained that the interview was to be semi-structured and that probing questions would be determined by the information given by the participant. Lastly, as claimed by Talbot (1995), the researcher asked permission to tape record the interviews as well as the time scheduled for each interview. The researcher explained to the Mathematics subject advisors and educators that the interviews would be tape recorded, then translated and transcribed using verbatim quotes. The Mathematics subject advisors and educators were made comfortable by

having a general discussion before the interview in order to ensure a cordial atmosphere.

A protocol for data collection was established with the use of three pages and each was labelled as follows:

Page 1 contained participants' demographic information. On this page, the time, place and date of all the activities that took place during the collection of data were noted (see Appendices F & G).

Page 2 contained the descriptive additional notes. On this page, subject advisors' and educators' responses to the research questions were recorded as they were interviewed (see Appendix I).

Page 3 consisted of reflective notes written after each interview. Given that qualitative research is inductive, the researcher's personal thoughts were recorded based on his feelings, perceptions, understandings, concerns and problems experienced during the process of collecting data (see Appendix J).

Phenomenological interviewing is described by Willis (2007) as a specific type of in-depth interviewing grounded in the theoretical tradition of phenomenology. There is a relationship between the method and the philosophical tradition, which distinguishes this interview from other forms. This distinction is clearly in the relationship between the participants and the researcher, as this moves from observational quantitative research to dialogue in qualitative research and then to reflect in phenomenological research. As claimed by Creswell (2014), such reflectivity appears to acknowledge that the researcher plays an important part in researching the curriculum leadership role of subject advisors for Mathematics improvement in South African classrooms. The reference to bracketing presupposes that it was the researcher contaminates the data. This important phenomenological reduction (bracketing) was done to suspend belief so that preconceptions of the curriculum leadership role of Mathematics subject advisors can be put aside and the true phenomenon be revealed in its true form to the phenomenologist, as advocated by Speziale and Carpenter (2003).

The interviews were intended to prompt an active conversation between the interviewer to gather subject advisors' and educators' perspectives regarding their

roles, practices, ideas, understanding and interpretation of Mathematics reform policies such as CAPS and Mathematics for All and creating the required conditions for Mathematics teaching and learning, which, in turn, influences learner achievement in Mathematics. Through these discussions, in-depth information was gathered in relation to the selected themes I had identified, as advised by Lee (1999).

Realising that the subject advisors' curriculum leadership role directly influences Mathematics teaching and learning in secondary schools, the seven educators and ten educators were included because they were the best sources of information about subject advisors' curriculum leadership role in South African secondary schools

### **3.6.2 Observation**

Shapiro and Heick (2004) view observation as one of the direct and objective measurement tools available for assessing subject advisors' curriculum leadership practices as well as educators' instructional practices. Amongst the common assessment tools used by school psychologists is the systematic observation of individual behaviour and practices (Reynolds & Kamphaus, 2004). Observations have been used for a number of tasks traditionally amongst which includes screening children needing further evaluation for behavioural and academic challenges, assessing educator classroom practices in order to formulate academic interventions, diagnosing learner achievement results, as well as controlling and monitoring of academic interventions (Hintze, 2005). According to Leff and Lakin (2005), several observations are essential to achieve a reliable estimation of individual's practices. In this study, multiple observations were done with the subject advisors and the educators in order to validate their instructional practices. The researcher had to consider observer bias and reactivity as a means to ensure best observation practices. Hintze, Volpe and Shapiro (2002) view reactivity to a target participant altering behaviours because of being observed, thereby resulting in estimates of actual targets that are inaccurate. In order to minimise reactivity, the researcher conducted multiple observations with the participants with the intention of increasing familiarisation (comfort) with the observer (researcher) in both educators' classrooms and subject advisors' workshops settings.

Observer bias is defined by Winsor (2003) as the tendency of an observer to consistently view and record behaviours in a specific way, that is, positive or negative which affects the accuracy of observations. In order to mitigate the possibility of observer bias, the researcher was involved in adequate training as well as periodic reliability checks of the observations. The researcher was trained on how to deal with observations because no assessment should depend on a single measurement method especially when evidence of validity and reliability is limited, as advised by Hintze *et al.* (2002). Reynolds and Kamphaus (2004) claim that when multiple methods are used to assess practices across multiple dimensions, assessments are enhanced. Like any other assessment methodology, observation was used in this study as part of a broader assessment strategy, irrespective of the assessment domain.

Observations were undertaken by the researcher in order to authenticate the kinds of interactions between subject advisors and educators in workshops, meetings and were intended to answer the second research question: *How do subject advisors, across a variety of contexts in South Africa, understand and go about implementing their roles in curriculum leadership and support for the improvement of Mathematics instruction?* Observation was undertaken by the researcher in an attempt to familiarise himself with the practices and interactions of the Mathematics subject advisors. The researcher remained unconstructively in the background as a non-participant, observing and listening to what the subject advisors were saying in real school situations and educator training workshops (Maree, 2007). Being immersed in the setting allows one to hear, see and experience reality as if from the subject advisors' perspectives (Marshall & Rossman, 1999). Non-participant observation means remaining detached from the situation, only recording what was happening in the social settings (Minichiello & Kotler, 2010). Being a non-participant also allowed for observation of the situation first-hand, which afforded the researcher better insight when interpreting the data. Observations also enabled the researcher to come up with his own interpretation of the manner in which subject advisors' curriculum leadership is shaped. The researcher intended to move a step further by getting an inside concept of how subject advisors curriculum leadership is practiced, in districts, municipalities as well as schools and its impacts on learner achievement results in mathematics.

The researcher was given permission to observe in situ interactions between subject advisors and educators promoting effective curriculum leadership role of mathematics subject advisors. Observations focused on who led the educator professional development workshops, how decisions were made, the types of responses and associations, who were the dominant participants, the topics discussed, the routines, artefacts and their use. The intention was to observe the manner in which subject advisors' curriculum leadership was enacted and the manner in which it influences learner achievement results in mathematics. Issues raised in the literature review such as collegiality, authority, and differentials could also be observed during district and or provincial meetings. The schedules were assessed by the researcher's supervisor for validity before observations were made. The observations were recorded on a template that reflected, the time and date, participants, action observed, situation and reflection (see Appendix L) as advised by Maree (2007). Two important dimensions were recorded: descriptions of the observed and my own reflection about the meanings of what was observed. Also, both nonverbal and verbal behaviour was also recorded such as differentials, collegiality, authority, concerns, attitude, beliefs and feelings.

Observations were undertaken with prior permission having been granted over six (6) months in subject advisors' workshops and in the selected secondary schools. The researcher also kept mental notes of conversations with subject advisors as well as educators and wrote them down immediately, while comprehensive notes were made at a later stage (see Appendix L).

### **3.6.3 Document Analysis**

Bowen (2009:29) defines document analysis as "a systematic procedure for evaluating and or reviewing documents either electronic (internet transmitted and computer based) or printed material". Document analysis requires that data be interpreted and scrutinised in order to elicit meaning, develop empirical knowledge and gain understanding just like other analytical methods in qualitative research (Corbin & Strauss, 2008). Images and texts (words) that have been recorded without a researcher's intervention are contained in documents and documents are referred to as social facts, which are shared, produced as well as used in ways that are

socially organised (Labuschagne, 2003). Advertisements, agendas, minutes of meetings, background papers, books, manuals, journals, letters, memoranda, newspapers, charts, maps, brochures, event programmes, programme proposals, summaries, radio, television and diaries are the variety of forms of documents that may be used for systematic evaluation as part of a research project. Newspaper archives, organisational (institutional) files, libraries and historical society offices are some of the places where the above types of documents are found.

According to Yin (2011: 58), document analysis is “often used in combination with other qualitative research methods as a means of triangulation, the combination of methodologies in the study of the same phenomenon”. The qualitative researcher is expected to draw upon varied sources of evidence; that is, to seek convergence and corroboration through utilising different data methods and sources (Bowen, 2009). Document analysis as a research method is applicable specifically to qualitative case studies that produce thick descriptions of a single event, organisation, program or phenomenon (Mills, Bonner & Francis, 2006). Besides this, the researcher can be assisted in uncovering meaning, discovering insights as well developing understanding of the relevant research problem through documents (Labuschagne, 2003).

Document analysis was undertaken to confirm the existing policy or regulatory framework that guides the curriculum leadership role of Mathematics subject advisors as well as the extent to which subject advisors complied with Mathematics curriculum reform policies such as CAPS. The seven subject advisors of the five districts in the Free State province of South Africa were requested to share documents, which were used to evaluate the extent to which these subject advisors interacted with Mathematics curriculum reform policies in executing their curriculum leadership role. The documents included minutes of subject meetings, files, school regulations, IQMS reports and school, cluster, district and provincial moderation reports for Mathematics educators in the ten selected secondary schools.

Documents also included the schools’ mission and vision statements and subject improvement programmes, if they existed, to elicit relevant information on the extent to which subject advisors complied with the following duties: passing on knowledge of the Mathematics curriculum and learning programme, conducting educator

appraisal and evaluation, planning, monitoring, controlling, implementing, organising and leading; and conducting educator development.

Finding, selecting, appraising as well as synthesising of data contained in documents entails the analytical procedure that was followed by the researcher. This was done in order to get data quotations, entire passages or excerpts that were then organised into major themes, categories and case examples particularly through content analysis as advocated by Charmaz (2003). Using these “un-obstructive data collective” (Yin, 2011: 36) strands, all activities were executed at times that suited the participants in order to minimise disturbance of their daily programmes or schedules. Information about participants’ free periods was obtained and their breaks were utilised.

To sum up these sections, the multiple data collection techniques discussed above were applied because they were considered suitable for eliciting the required data to address the research questions while at the same time, “securing a sufficient level of validity and enhancing triangulation” (Maree, 2007:79). Given that the data gathered through these techniques was dealt with interpretatively, the meaning of the data when analysed was done inductively.

### **3.7 DATA ANALYSIS**

Burns and Grove (2003: 480) view data analysis as a mechanism for reducing and organising data in order to produce findings that require interpretation by the researcher. Bogdan and Biklen (2003:148) see data analysis as “a process of systematically arranging and searching the interview transcripts and other materials accumulated, so as to enable the researcher to arrive at the findings”. Analysing data includes organising as well as breaking data into manageable units, coding as well as synthesising.

The main objective of this research was exploring the curriculum leadership role of Mathematics subject advisors and the implications of this leadership on the teaching and learning of Mathematics. After completion of each interview, the researcher transcribed the interviewees’ responses recorded during the interviews in preparation for data analysis and organised the detailed notes and document analysis so that this could be translated into meaningful descriptions as advocated

by De Vos (2002). As suggested by Henning, Van Rensburg & Smit (2004), the generic qualitative approach to data analysis was used as an analytical tool and the researcher used Tesch's process to analyse unstructured data, as described by Creswell (1994:153-157).

Data analysis is a challenging and creative process characterised by an intimate relationship of the data generated and the researcher with the participants (De Vos, 2002:340). In this study, data gathered from seven subject advisors and ten educators led to an understanding, interpretation and perceptions of and beliefs and attitudes regarding the curriculum leadership role of Mathematics subject advisors for Mathematics improvement in the analysis. Emerging data from the data collection process is displayed by a narrative text, as well as verbatim quotes and because the qualitative study is naturalistic in nature, the results are presented in a descriptive narrative form, using thick descriptions to communicate' (Creswell, 2013:34).

Cohen and Morrison (2001) claims that qualitative data analysis needs to be conducted with rigor and care. In phenomenological research, the analysis begins as soon as the first data are collected and they may consist of not more than a single interview, as suggested by Speziale and Carpenter (2003:69). Another characteristic is that qualitative research analyses data by extracting themes and uses a holistic unit of analysis, concentrating on the relationships between concepts, elements and so on (Weisenmiller, 2008). When researchers prepare to analyse the data, their first duty is a conceptual one: the clarification of their own preconceptions, perceptions and beliefs of the phenomenon under investigation. This is regarded as bracketing which means suspending as much as possible the researchers' prior meanings as well as interpretations and entering into the world of individuals that will be interviewed, as articulated by Tesch (1992). Phenomenology reading is more than merely taking note of the content. The researcher immersed himself in the data, lived with the data as well as reading and rereading the data in order to achieve a sense of whole and closeness to the data. When the researcher was satisfied that the text was more accessible, all meaning units throughout the entire interview transcriptions were delineated, and a decision was made on which ones were relevant to the research questions asked and then bound in to meaning units (Tesch, 1991:90).

Henning (2004) suggests that data analysis requires researchers to become immersed in the data or dwell with the data. Data analysis is done to preserve the uniqueness of each participant's lived experiences while permitting an understanding of the curriculum leadership role of Mathematics subject advisors. This commenced with listening to the Mathematics subject advisors and educators' descriptions followed by reading as well as rereading the verbatim transcripts (Maree, 2007).

Data can be analysed through content analysis or through thematic analysis, each of which is discussed below.

### **3.7.1 Content Analysis**

Powers and Knapp (2006:400) define content analysis as a "general term for a number of different strategies used to analyse text". It is a categorising and systematic approach that is used to explore huge volumes of information unobtrusively that is textual in order to determine the pattern as well as trends of words used their discourses and structures, their relationships as well as their frequency (Gbrich, 2007; Loffe & Yardley, 2004). Bloor and Wood (2006:34) claim that "content analysis describes characteristics of the document's content by scrutinising who says what, to whom and with what effect". The investigator, who has a wider understanding of the context influencing the responses of the participants, may develop a broader understanding of issues under investigation. Content analysis certainly makes sense of what is communicated between individuals, textual matter, messages, mass media content, technology interactions that are socially supported and symbols (Hsieh & Shannon, 2005; Morgan, 1993). Elo and Kyngäs (2008) claim that analysing multifaceted, sensitive as well as important phenomena is mostly suitable for content analysis. Green and Thorogood (2004) concur that the simple reporting of issues that are common when conducting exploratory research in a field where not much is known is mostly suitable for content analysis. Content analysis uses a descriptive approach in both coding of the data as well as data interpretation of quantitative counts of the codes (Bloor & Wood, 2006).

There is danger of missing the context if in content analysis the frequency of codes is only counted to get significant meanings in the text, as stated by Morgan (1993). Researchers using content analysis alone are sometimes, therefore, accused of removing meaning from its contextual settings. The challenge is that a coding

category or word may occur more frequently in the responses of one participant or group than other reasons that are varied. Greater importance could be indicated by frequent occurrence; however, it might reflect greater willingness simply or ability to talk at length about the phenomenon under study (Shields & Twycross, 2008).

### **3.7.2 Thematic Analysis**

Thematic analysis is seen often as a poorly branded method, in the sense that it does not appear to exist as a named method in the same way that content analysis does. Loffe and Yardley (2004) argue that thematic analysis has the potential of offering systematic element characteristics of content analysis as well as allowing the researcher to combine their interpretations within their specific context. According to Braun and Clarke (2006:78), thematic analysis as an independent qualitative method, is described mainly as a “method for identifying, analysing as well as reporting themes within data”. It has been introduced as a qualitative descriptive method providing core skills to researchers for conducting many other forms of qualitative analysis. Qualitative researchers in this respect should become more familiar with thematic analysis as a reliable and independent qualitative approach to analysing data.

The context within which the available texts are explored is a requirement for every data analysis process. As argued by Krippendorff (2004), the researcher must construct a world in which the data makes sense thereby allowing the researcher to answer his or her research questions. This means that thematic analysis is mostly suitable for answering research questions such as, what are the experiences, concerns, ideas, perceptions and understanding of subject advisors and educators about the curriculum leadership role of subject advisors. Secondly, what are the challenges and or opportunities that are encountered by subject advisors in executing their curriculum leadership role? Both Vaismoradi, Salsali and Mark (2011) and Braun and Clarke (2006) suggest that thematic analysis is a useful and flexible tool for analysing data that provides detailed and rich descriptions as well as a complex account of the data. Thematic analysis clearly involves the search and identification of common threads that extend across an entire set of interviews (Gbrich, 2007). Vaismoradi *et al.* (2011) point out that nuanced account of data, which is detailed and purely qualitative, is provided by thematic analysis.

Sparker (2005) and Pavlenko (2007) assert that both thematic and content analysis have a common aim of scrutinising narrative materials from life stories analytically through breaking the texts into relatively small units of manageable data (content) as well as submitting them to descriptive treatment. Both thematic and content analysis provides investigators with an analysis framework within which the context of data is apparent.

### **3.7.3 Steps followed in Data Analysis**

The large amount of data was reduced to a meaningful amount to enable analysis. The data were analysed according to the eight steps, as proposed by Tesch in De Vos, 1998:343-344) in order to identify and extract significant statements as he became immersed in the data. It is important to identify how central themes or statements emerge and relate to each other in order for the final descriptive to be comprehensive and exhaustive, as suggested Speziale and Carpenter (2003).

**Step 1:** The researcher ought to read the entire transcript carefully to obtain a sense of the whole and to jot down some ideas. The recorded interviews were transcribed word for word including pauses. After transcribing the tape-recorded interviews, the researcher replayed the tape-recorded interviews to listen to the tone, voice, responses and pauses as well as to the whole content, as claimed by Krippendorff (2004). Laughter, voice, tone and exclamations are clearly captured and analysed well using content analysis as pointed by Burns and Grove (2003). In addition, the researcher replayed the tape to correlate the information for accuracy after transcribing, as suggested by Speziale and Carpenter (2003) and then read and reread the interview transcriptions in their totality, making notes of ideas that came to mind.

**Step 2:** The researcher selects one case, asks “what is this about?” and thinks about the underlying meaning in the information. The researcher’s thoughts can be written in the margin. The researcher then selected one interview and read it to try and extract meaning in the information and jotted down thoughts and ideas next to specific sections. In addition, memos were used to record ideas or insights associated to notes, codes or transcripts. The researcher recorded any ideas that emerged, even if they were not well thought out or vague and memos were given dates and titles

**Step 3:** A list is made of all the themes or topics. Similar themes or topics are clustered together. After going through the transcripts, the researcher arranged similar topics in groups by forming columns, labelling major topics, unique topics and leftovers (Elo & Kyngäs, 2008).

**Step 4:** The researcher applies the list of themes or topics to the data. The themes or topics are abbreviated as codes, which are written next to the appropriate segments of the transcripts. The researcher tries out this preliminary organising scheme to see whether new categories and codes emerge. At this stage, the researcher realised that more than one theme may exist in a set of interviews. Once the themes that appear to be significant were identified, the concepts connecting substantial portions of the interviews were written down and entered on a laptop, as pointed out by Bowen (2008). Coding and codes were used as a way of identifying or indexing data categories and the purpose of coding was to facilitate the retrieval of data segment by coding category. Coding entailed identifying appropriate segments of the text or chunks of data and assigning a specific name to it. The researcher identified patterns and themes from the data and coding was used to transform, expand, and reconceptualise data thereby providing opportunities for more diverse analysis (Hsieh and Shannon, 2005). It was important to scan through the organisation of data once it was coded to check if new codes emerged.

**Step 5:** The researcher finds the most descriptive wording for the themes or topics and categorises them. A category system was invented and applied to the coded data. As pointed out by Brink (1999:191), several categories could be identified within the data recorded for any given participant and the categories with the greatest priority were identified and compared later with those of other participants to determine the final theme. Lines are drawn between categories to show the relationships. Descriptive wording was identified for the topics and converted into categories. The aim was to reduce the total list of categories by grouping topics together relating to each other. Categories were linked and interconnections of categories were established (Elo & Kyngäs, 2008). The connections identified could be antecedents, consequences or concurrence of an initial category.

**Step 6:** The researcher makes a final decision on the abbreviation for each category and alphabetises the codes. Each category was confirmed with an appropriate

abbreviated and these were then arranged alphabetically. According to Burns and Grove (2003: 382), “analysis goes beyond description because data is extended and transformed”. There is identification of essential features and description of connections among them in data analysis.

**Step 7:** The data material belonging to each category is assembled and a preliminary analysis is performed. Once the category data was put together in one place, an initial analysis was performed.

**Step 8:** The researcher recodes existing material if necessary. Lastly, recording of data was done and categories (themes) were developed to obtain similar and alternative explanations for the findings (Tesch in De Vos, 1998: 343-344).

Participants’ responses led to the identification of themes in relation to Mathematics subject advisors’ curriculum leadership role and its implications in secondary schools, which in turn influence the teaching and learning of Mathematics. The process of analysing data was done for each theme and the sub-themes identified in the analysis (Brewerton & Millward, 2001).

The researcher was aware of the concept of data adequacy or saturation. George, Hall and Stiegelbauer (2006) views data adequacy as the amount of data obtained when saturation has occurred or not occurred. Saturation was achieved slowly as each category was reasonably covered and no new data emerged. The researcher chose to categorise the data into sub-categories of two or more, once the categories had ample data, as claimed by Morse and Field (1996:116), saturation was deemed to have been reached. For efficient data storage and retrieval, computer software was used.

#### **3.7.4 The Description Stage**

Burns and Grove (2003) argue that the descriptive stage is more critical in qualitative studies as it is the initial stage whereby the researcher becomes familiar with the data. The researcher used bracketing, reflexivity and intuiting in order to exclude any preconceived ideas about the curriculum leadership role of Mathematics subject advisors. Cutcliffe (2003) claims that bracketing should not be merely a term used in a study to validate or justify the researcher’s method but rather, a rich concept that can facilitate effective and needed research qualitatively. Bracketing consists of

three general but distinct phases and within each phase; there exists core elements made up of different components. The researcher's theoretical framework, research questions, focus, as well as emphasis, will determine the compositions of these elements and ultimately dictate the type of bracketing. The three phases of bracketing are abstract formulation, research praxis and reintegration.

Both Fontana (2004) and Mruck and Mey (2007) views, reflexivity as one of the pillars of qualitative research and it refers to the generalised practice in which researchers strive to make their influence on the research explicit to themselves, and often to their audience either intentionally or unintentionally. Reflecting on the process of one's research and attempting to understand the manner one's own views and values may influence findings, adds credibility to a research project and should be part of any method of qualitative enquiry (Mruck & Mey, 2007). LeVasseur (2003:415) defines intuiting as "the preconscious recognition of the pattern and or possibilities inherent in a personal stream of experience". Intuiting is located within the individual; individuals develop novel insights based on their experience and their ability to ascertain potential or underlying patterns in that experience, and they then translate those insights into metaphors that provide the possibility of their communication (Corbin & Strauss, 2008). Cohen and Crabtree (2008) attested that reflexivity should change our minds in the way we understand data as well as its collection and is achieved through internal dialogue, detachment and scrutinising of what I know and the manner I know it.

It was important for the researcher to investigate the curriculum leadership role of Mathematics subject advisors with the right instruments, but ignoring any preconceived ideas about the topic under investigation. The researchers' role was to prompt, encourage and probe participants on their views, ideas, understandings and experiences of subject advisors' curriculum leadership role and the manner in which it influences Mathematics teaching and learning in South African secondary schools.

In order to uncover the meaning of the experiences, perceptions, ideas, thoughts, beliefs and concerns of Mathematics subject advisors' curriculum leadership role, as previously explained, in addition to conducting the analysis, personal feelings and experiences were also explored that might influence the study and integrate this understanding into the study (Burns & Groove, 2003).

### **3.8 MEASURES OF TRUSTWORTHINESS**

According to Schwandt (2001:259), trustworthiness refers to “the quality or goodness of an investigation that makes it noteworthy to audiences” and is defined by Speziale and Carpenter (2003) as establishing the reliability and validity of qualitative research. Trustworthy is this study is assured when it accurately represents the experiences, beliefs, perceptions, ideas, thoughts, understanding and concerns of the Mathematics subject advisors and educators about the curriculum leadership role of Mathematics subject advisors. Trustworthiness of data in method triangulation was illustrated through the researchers’ attention to, and confirmation of information discovery, as claimed by Corbin and Strauss (2008). This is known as rigor and the goal of rigor in this study was to represent accurately the study participants’ curriculum leadership experiences and understandings. The Mathematics educators at the ten secondary schools and Mathematics subject advisors were also identified by pseudonyms. This was done to avoid becoming confused regarding the origins of data, since the study worked with large volumes of data from both the educators and subject advisors hence the data required careful handling to ensure authenticity (Mruck & Mey, 2007) of the exploration of Mathematics subject advisors’ curriculum leadership findings.

Lincoln and Guba’s (1985) model for establishing trustworthiness in qualitative research was used in this study because it is well developed conceptually and has been used extensively by qualitative researchers. The four criteria to measure trustworthiness of data include credibility, dependability, transferability and conformability.

#### **3.8.1 Credibility**

According to Speziale and Carpenter (2003: 38), credibility is demonstrated when “participants recognise the reported research findings as their own experiences, beliefs, ideas, concerns, thoughts and perceptions”. Similarly, Talbot (1995) views credibility as the truth of how subject advisors and educators know and experience the curriculum leadership role of subject advisors for the purposes of instructional improvement. The researcher attempted to provide a confluence of evidence that breeds credibility by data triangulation, as claimed by Creswell (2013). Through the examination of data collected with different methods, the researcher attempted to

corroborate findings across sets of data thereby mitigating the impact of bias that can potentially exist in a single study. Corbin and Strauss (2008) claims that triangulation assists the investigator in guarding against the accusation that a study's findings are simply an artefact of a single method, a single source, or a single researchers' bias.

The researcher, in order to ensure credibility, had to ensure that the participants were identified and described accurately, as advocated by Creswell (2002). Prolonged engagement, triangulation, reflexivity, peer as well as participant debriefing and member checks were the activities that increased the probability that credible findings are produced. In this study, the following strategies were applied to ensure credibility:

#### **3.8.1.1 Persistent observation**

Persistent observation's purpose is to identify those characteristics and elements in the situation that are most relevant to the problem or issue being pursued and to focus on them in detail, as viewed by Lincoln and Guba (1985). The researcher tentatively identified the Mathematics subject advisors and educators' behaviour at their work places and at a time that was convenient for them, in order to satisfy this criterion of trustworthiness. As claimed by Holloway (2005), the presence of the researcher in the Mathematics subject advisors' workshops enabled him to observe the occurrence of their leadership as well as the interactions involved. This enabled him to sort irrelevances.

#### **3.8.1.2 Prolonged engagement**

Lincoln and Guba (1985) define prolonged engagement as the investment of sufficient time in order to achieve certain purposes such as culture learning and testing for misinformation introduced by distortions either of the participants or of the self as well as building trust. Spending enough time and becoming oriented to the situation and context of Mathematics subject advisors' curriculum leadership practices was therefore imperative to the researcher. Prolonged engagement also required the investigator to be involved with a site long enough to detect as well as take into account distortions that might otherwise creep into the data. It was on this note that the investigator first dealt with personal distortions (preconceived ideas) of the curriculum leadership role of Mathematics subject advisors for Mathematics

improvement in South Africa. As advocated by Creswell (2014), the mere factor of being a stranger in a strange land, draws undue attention to the inquirer, with its attended overreaction.

Prolonged engagement was one of the strategies that increased credibility of this investigation. The researcher works as a school principal in the Xhariep district (four years) and works directly with Mathematics subject advisor and educator staff development initiatives, where curriculum leadership is performed. This reflected the investigators' prolonged engagement with participants of the curriculum leadership role of Mathematics subject advisors under exploration. As claimed by Bloor and Wood (2006), enough time was spent with the participants in order to develop trusting relationships during interviews, observations and member checks.

### **3.8.1.3 Peer and participant debriefing**

Willis (2007) defines peer debriefing as a process of exposing oneself to a disinterested peer in a manner paralleling an analytic session and for the purpose of exploring aspects of the enquiry that might otherwise remain only implicit in the inquirer's mind. Peer debriefing exposed the investigator to the searching questions of others who are experienced in the methods of enquiry, the phenomenon or both, as articulated by Maree (2007). In this investigation, the researcher exposed the research work to colleagues for constructive criticism. Debriefing increased credibility. Yin (2011) claims that participant debriefing (member checks) involves the investigator returning to the participants and checking the findings with him or her to confirm their curriculum leadership experiences as true. This was done with all seven subject advisors and ten educators who participated in this study.

### **3.8.1.4 Reflexivity**

As advocated by Burns and Grove (2003), the investigator was part of and not divorced from the phenomenon under investigation and in the study, constantly took the position of the main research person. The researcher explored personal feelings as well as experiences that might influence the study and integrated this understanding into the study to promote objectivity. The analysis of the researcher's experience made him aware of possible preconceived ideas and biases. Bracketing was implemented throughout the study and each stage of the research was carefully approached using bracketing (to lay aside what is known) and intuiting (looking at

the phenomenon) to avoid bias and approach Mathematics subject advisors' curriculum leadership role with an open mind.

#### **3.8.1.5 Member checks**

Member checks were done whereby data, analytical categories, interpretations as well as conclusions were tested with members of those stakeholder groups from whom the data were collected originally and it was the most crucial technique for establishing credibility, as argued by Polit and Hungler (2004). Lincoln and Guba (1985) also point out that if researchers are to be able to purport that their reconstructions are recognisable to audience members as adequate representations of their own realities, it is crucial that they be given the opportunity to react to them. The researcher carried out member checks with the participants' feedback and the participants checked categories that emerged from the data and after the themes were finalised, the investigator discussed the interpretation and conclusions with participants.

#### **3.8.2 Dependability**

In qualitative research, dependability is another criterion used to measure trustworthiness. Speziale and Carpenter (2003:39) view dependability "as securing the findings' credibility". It is the stability of data over time and is obtained with stepwise replication and enquiry audit, as claimed by Creswell (2014). Speziale and Carpenter (2003) argue that since there can be no validity without reliability and thus no credibility without dependability, an illustration of the former is sufficient to establish the later. Dependability is related to the consistency of findings and this means that if the investigation was to be repeated in a similar context with the same participants, the findings would be consistent, as viewed by Maree (2007). In qualitative research, the participants and the researcher are the instruments to be used for consistency. For the findings of an investigation to be dependable, they should be checked as well as audited by means of external checks. A more direct technique is the overlap method, which is simply one way of carrying out the first argument as opposed to a separate approach.

Lincoln and Guba's (2005) stepwise replication and inquiry audit are two more techniques. Gbrich (2007) claims that stepwise replication is a process that builds on the classic notion of replication as the means of reliability establishment. The inquiry

audit is metaphorically based on the fiscal audit and the inquiry auditor examines the product, the data, findings, interpretations as well as recommendations and attests that it is supported by data and is internally coherent so that the bottom line may be accepted. According to Lincoln and Guba (1985:333), “this process establishes the confirmability of the inquiry and thus a single audit can be used to determine simultaneously confirmability and dependability”. The supervisor of this research project was responsible for examining the data, findings, interpretations as well as recommendations in order to attest that they are supported by data. This activity was a means of establishing confirmability of the investigation in this study.

### **3.8.3 Transferability**

Speziale and Carpenter (2003) view transferability as the probability that the findings of the study have meaning to others in similar situations. According to Holloway (2005), transferability is also called fittingness for it determines whether the findings fit in or are transferable to similar situations. It is the potential user and not the researcher who determines whether the findings are transferable. Transferability is the extent to which the findings from the data can be transferred to other settings. Applicability and generality are irrelevant to qualitative research because the investigator wants to describe a particular phenomenon. As claimed by Yin (2011), it is the researchers’ responsibility to provide a dense description of the research context and sufficient descriptive data that the reader can assess and evaluate the transferability or applicability of the data to another context and setting. The researcher described the data sufficiently in order to allow comparison.

According to Willis (2007), with a purposive sample, the selection of participants should fulfil the study’s need. The researcher approached the participants with experience and knowledge of the curriculum leadership role of Mathematics subject advisors. The process of member checks ensured transferability in the current study and enhanced the possibility that the findings have the same meaning for other Mathematics subject advisors. As advocated by Maree (2007), a thick or dense description of the participants’ experiences, perceptions, ideas, thoughts, understanding, regarding their interpretations and beliefs of the curriculum leadership role of Mathematics subject advisors in their context, was discussed. This was done in order to provide rigor as well as a clear comprehensive decision trial so

that the reader can consider if the findings are transferable to other settings, as suggested by Speziale and Carpenter (2003).

The researcher ensured the trustworthiness of the findings by exposing the study to colleagues for constructive criticism as well as sharing the findings with Mathematics subject advisors and educators who did not participate in the study. Lastly, one subject advisor who participated in this study and recently achieved his PhD in Mathematics education, also examined the findings, interpretations and recommendations as well as attesting to the fact that they are supported by data from the participants.

#### **3.8.4 Confirmability**

Both Lincoln and Guba (1985) and Speziale and Carpenter (2003) agree that confirmability is a neutral criterion for measuring the trustworthiness of qualitative research and if a study demonstrates fittingness and credibility, the study is also said to possess confirmability. According to Polit and Hungler (2004:436), "it is a criterion for evaluating data quality and refers to the neutrality and objectivity of the data by an agreement between two or more dependent persons that the data is similar". As stated by De Vos (2002), it is a strategy to ensure neutrality and it means that the findings are free from bias. Neutrality refers to data neutrality as opposed to the researchers' neutrality in qualitative research and the use of audit strategies is a systematic collection of materials and documents so that external or dependent auditors come to comparable conclusions about the data. Speziale and Carpenter (2003) claim that the purpose of confirmability is to demonstrate that the evidence as well as thought processes result in the same conclusions as in the research context.

Teddlie and Tashakkori (2012) recommended that the following auditing criteria be used for examining the information of the study: the raw data, namely tape recordings and field notes. Secondly, findings of the study through analysed data as well as how the significant statements, codes, themes and categories are reconstructed. In addition, early intentions of the study, for instance proposal and expectations coupled with the research process, designs and procedure used. Lastly, the development of the data collection instruments for instance, open ended questions and early interviews.

Confirmability occurs in the presence of transferability, dependability and credibility. In the first place, the researcher collected the data from tape recorders and this was followed by raw data analysis and findings of the study through de-contextualisation. Besides this, the researcher also made a synthesis of the analysed data through re-contextualisation and carefully planned each stage of the research process, research design, sampling design as well as the process of collecting data. The researcher also made sure that the conclusions of the study's findings were supported by the analysed data.

### **3.9 ETHICAL CONSIDERATIONS**

Audi (1999:284) defines ethics as “the philosophical study of morality”. Ethics is also used interchangeably with morality and sometimes it is more narrowly defined to mean the moral principles of a specific tradition, individual or group. Elliot (2005) refers to the importance of being aware of political and ethical issues when undertaking research and this distinction appears to be a useful one since it draws attention to wider issues in research.

*The term ethical is used to describe those issues that relate to the relationship between the researcher and the research subjects or participants and the impact of the research process on those individuals directly involved in the research, while the term political is used to describe the broader implications of research in terms of the impact it may have on society or on specific subgroups within society (Elliott, 2005: 133-135).*

The above description is closer to the approach that was adopted by the current study, based on acknowledging that ethical issues go beyond individual participants (Guba & Lincoln, 2005) and that the exploration of Mathematics subject advisors' curriculum leadership role takes into account the wider moral and ethical implications of the study.

In this study, the researcher had a moral obligation to consider strictly the rights of the participants, who were expected to provide knowledge about the curriculum leadership role of Mathematics subject advisors in South African secondary schools as advocated by Speziale and Carpenter (2003). Before the data were collected at

the selected secondary schools in the Free State, the researcher obtained approval from the Free State Department of Basic Education, school principals, subject advisors and educators after the purpose as well as the nature of the research project (Cutcliffe, 2003) was explained. The participants were informed of ethical matters, such as confidentiality of the collected data, guarantee of anonymity as well as an assurance that the collected data would only be used for the purposes of the study, as advised by Creswell (2013). Besides these issues, the researcher also established trust between the participants and himself as well as to maintain the spirit of collegiality.

### **3.9.1 Confidentiality and Anonymity**

Confidentiality means that no information that the participants divulge is made available to others or public, as stated by Creswell (2014). The anonymity of an institution or person is protected by making it impossible to link aspects of data to a specific institution or person. As claimed by Willis (2007) confidentiality and anonymity are guaranteed by ensuring that data obtained are used in such a way that no one besides the researcher and the supervisor know the source. Efforts were made to protect the privacy and confidentiality of all the seven Mathematics subject advisors and ten Mathematics educators. As claimed by De Vos (2006), the principle of confidentiality can be violated in different ways in research and hence it was imperative that the researcher acted with the necessary sensitivity. Besides this, participants were given the right to decide the place (where), the time (when), to whom and the extent to which they were prepared to reveal their ideas, beliefs, opinions, behaviour, perceptions and concerns (Smith, 2008). It was equally important to assure Mathematics subject advisors and educators that the answers to personal questions remained confidential so that readers of the final script would not be able to deduce the identity of the individual participants, as claimed by Budhal (2000). The participants were also assured that the data collected were only to be used for the study, no other persons would have access to it and that their identities as well as their schools and districts would not appear in any part of the final report, as claimed by Bless and Higson-Smith (2004). Thus, in this study, no names were attached to the information that was obtained, but codes were used.

For easy management of data, the schools and the participants were code-named. Coding was done in order to conceal the identity of participants and as a way to submit to ethical considerations. The ten secondary schools were given the codes A to J. Coding was ordered according to the sequence of initial visits to the schools. In addition to the alphabetical codes, codes showing the category of the school were also included. Categorising the schools became relevant to the study after it was discovered that authorities, such as School Governing Bodies, unions (SADTU and NAPTOSA) and the school principal, exert a huge influence over the appointment of educators in public schools. In addition to the codes categorising schools, the anonymity of educators and subject advisors was maintained, as no one, not even the educators and subject advisors themselves, can identify a school by its code, because they do not know the sequence in which the schools were visited. The public schools were coded PS and private schools were coded PRS.

### **3.9.2 Consent**

The purpose of the study was explained to the participants and their consent to participate was obtained. Informed consent was obtained from all participants and in so doing, Mathematics subject advisors, educators, school principals of the selected schools and the Free State Department of Basic Education were provided with information concerning the study's purpose. The researcher also provided them with information regarding the manner in which data would be used, the kind of participation required and expected from them, amount of time required for the study as well as when and where the interviews would be conducted. The researcher requested permission to conduct the study from the Free State Department of Basic Education and the school principals of educators involved in the study (Appendices A and D). Written permission was sought from the Mathematics subject advisors and educators (participants) for the interviews (Appendix C) as well as analysing of documents such as subject advisors' reports and educators' files, as pointed out by Polit and Hungler (2004). Tape-recordings of the Mathematics subject advisors and educators' interviews were done with prior permission from the individual participants and the participants were informed that all audio recordings would only be used for the purposes of the research. The Mathematics subject advisors and educators were not compelled to participate nor their freedom of choice infringed, upon as advised by Brewerton and Millward (2001).

### **3.9.3 Danger of Indirect or Direct Coercion**

Participants of this study were made aware of the nature and purpose of the research project and their consent to participate without being coerced, as pointed out by Budhal (2000). The data collected were used in accordance with Southworth's (2000) advice, in a manner representing the viewpoints of participants. Therefore, in this study, participation was voluntary and no participants were forced to divulge information that they felt uncomfortable sharing, as voiced by Bless and Higson-Smith (2004).

### **3.9.4 Objectivity, Justice and Fairness**

The study followed advice given by Cohen *et al.* (2011), that participants should not be directly exposed to the misrepresentation of facts in order to make them believe what was not true because doing so, would be violating the dignity of participants. In this study of the exploration of the curriculum leadership role of Mathematics subject advisors and the manner in which it influences Mathematics teaching and learning, deception was not warranted, therefore, it was vital as the researcher to be open and honest (Fox & Bayat, 2007).

### **3.9.5 Human Rights**

The participants' right to refuse to participate in the research project was respected and a formal agreement was negotiated with the participants, in which they were informed of their right to withdraw from the research at any time as suggested by Bless and Higson-Smith (2004). The true function of action during the research was not concealed in an attempt to avoid deceiving participants and such concealment was regarded as a violation of mutual expectations of trust and as disrespectful to participants.

### **3.9.6 Role Demarcation**

The researcher understood the interests and roles of the participants (Budhal, 2000), which facilitated special actions when the individual Mathematics subject advisors and educators had low social status or were uncomfortable and unfamiliar with social research, as maintained by Mouton (2001).

### **3.9.7 Privacy**

De Vos (2002:67) defines privacy as referring “to agreements between persons that limit the access of others to information that is private”. In this study, the researcher ensured that when participants described their experiences, feelings, beliefs, perceptions, ideas and concerns about the curriculum leadership role of Mathematics subject advisors, the information given would not be divulged. In the same vein, Burns and Grove (2003) view privacy as the freedom an individual has to determine the extent, time and general characteristics under which private information will be withheld or shared with others. Privacy was also maintained by not attaching participants’ names to the information when presenting data.

### **3.9.8 The Right to Withdraw from the Study**

The participants were informed that they could withdraw from the study at any time if they wished to and this right was explained to participants prior to engagement in the study, as advised by Holloway (2005). The right to withdraw from the study at any time was part of the informed consent.

### **3.9.9 Dissemination of Results**

Results are disseminated in the form of a research report and the report stimulates readers to want to study it as well as determining its feasibility for implementation (Cohen *et al.*, 2011). The report does not expose the secrets or weaknesses of the institution and participants to the readers but suggests recommendations for improving the curriculum leadership role of Mathematics subject advisors with the intention of improving educators’ classroom practices, which might ultimately improve learner achievement results in Mathematics. The participants were informed that once the research project was completed and published a copy of the findings would be handed to the provincial offices, district offices, as well as schools where the study was conducted. In addition, the information would be published in the relevant journals. Lastly, anonymity was assured because the results did not mention the names of the participants.

### **3.10 SUMMARY OF THE CHAPTER**

Chapter 3 presented the research design and methodology. It described and provided a detailed description of how data on the curriculum leadership role of mathematics subject advisors was collected. It gave a detailed explanation of the general approach used, its historical and philosophical assumptions, the research paradigm and the research design employed as well as the different instruments used in collecting data were also discussed in this chapter. The chapter discussed extensively the manner in which qualitative approach was utilised to get the best results for this project. A detailed explanation of population and sampling, data collection, data analysis, trustworthiness and adequacy as well as ethical considerations that were applied in this study were also unpacked. Chapter 4 will present, analyse and discuss the research findings with reference to the literature reviewed in Chapter 2.

## CHAPTER 4

### PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS

#### 4.1 INTRODUCTION

The research approach, the research design, procedures for collecting data as well as the techniques for analysing data and issues of ethical consideration underpinning the study were outlined in Chapter 3. Chapter 4 gives the presentation, analysis and discussion of the findings on the curriculum leadership role of Mathematics subject advisors for Mathematics improvement in South Africa. The implications of these findings for the teaching and learning of Mathematics in secondary schools are also discussed. Findings relating to the experiences, roles, perceptions, practices, ideas, understanding, concerns and interpretation of Mathematics subject advisors and educators concerning the curriculum leadership role of Mathematics subject advisors as well as the manner in which it influences Mathematics teaching and learning, is presented in Chapter 4.

#### 4.2 DATA PRESENTATION

Codes and categories listed in Table 4.1 below were used to present the findings and indicate the contexts in which the data were collected.

**Table 4.1: School codes and their categories**

School Code	Category
School A	PRS
School B	PRS
School C	PS
School D	PRS
School E	PS
School F	PS
School G	PS
School H	PS
School I	PRS

School Code	Category
School J	PS

Table 4.2 shows the district code, subject advisors' pseudonyms and the race of the subject advisors who participated in this study.

**Table 4.2: District codes, subject advisors' pseudonyms and race**

Subject Advisor	District Code	Subject Advisors' Pseudonyms	Race
1	District A	Marry	White
2	District B	Charles	Coloured
3	District B	Veronica	Coloured
4	District C	Paul	Black
5	District C	Thokozani	Black
6	District D	Natasha	Indian
7	District E	Andrew	White

Table 4.2 indicates the sequence in which subject advisors were interviewed as well as the races of the subject advisors. In District A only one subject advisor (Marry) participated, in District B, two subject advisors (Charles and Veronica) participated, in District C, two subject advisors (Paul and Thokozani) participated, one subject advisor participated in District D (Natasha) and one subject advisor (Andrew) participated in District E.

Table 4.3 shows the school codes, educators' pseudonyms and the race of educators who participated in this study.

**Table 4.3: School codes, educators' pseudonyms and race**

School Code	Educators' Pseudonyms	Race
School A	Themba	Black
School B	Mavis	White

School Code	Educators' Pseudonyms	Race
School C	Jerome	Coloured
School D	Albert	Indian
School E	Jessica	White
School F	Fionah	Coloured
School G	Siyabonga	Black
School H	Helen	Coloured
School I	Khulekani	Black
School J	James	Chinese

In addition to using pseudonyms to protect participants' identities, it was also important to avoid addressing subject advisors and educators by titles that would hint at and/or possibly reveal their gender (Dr/Mr/Mrs/Miss) – this measure was intended to protect the participants and the researcher's identity. The job title is used instead, for example, 'subject advisor or educator Marry' or the subject advisor or educator is simply addressed directly by their pseudonym (Marry). This also ensured that data could not be matched to any subject advisor or educator who participated in this study. Before the participants signed the consent forms, the researcher's intention to maintain the confidentiality of participants, as advocated by Cohen *et al.* (2011), was emphasised. Efforts were made to keep this promise as far as possible. Participants consisted of male and female subject advisors and educators.

#### 4.2.1 Demographic Data of Subject Advisors and Educators

Table 4.3 provides demographic details of the subject advisors. Data relating to their gender, experience in teaching, experience in the subject advisor post and reasons for their appointment, subject specialisation and qualifications is provided. I will refer to Table 4.4 when presenting data on the criteria used for the appointment of subject advisors.

Table 4.4 shows subject advisors' pseudonyms, gender, teaching experience, experience in the subject advisors' post, and reason for appointment, subject specialisation, qualifications and age.

**Table 4.4: Demographic data for subject advisors**

Subject Advisors' Pseudonyms	Gender	Teaching Experience (years)	Experience in Subject Advisors' Post (years)	Reason for Appointment	Subject Specialisation	Qualifications	Age
Marry	F	17	9	Experience, qualification	Mathematics, Chemistry	B.Sc. B.Ed. Honours	41 - 50
Charles	M	23	6	Good results, qualification, experience	Mathematics, physics	B.Sc. ACE	41 - 50
Veronica	F	18	10	Qualification, Good results	Accounting, Economics	B.Ed.	31 - 40
Paul	M	21	14	Qualification, experience	Mathematics, Statistics	B.Sc.	41 - 50
Thokozani	M	26	15	Experience Good results Qualification	Mathematics, Chemistry	B.Ed.	50>
Natasha	F	16	9	Qualification, experience Good results	Mathematics, Accounting	B.Acc. PGCE	31 - 40
Andrew	M	24	18	Quality results	Physics, Chemistry	B.Sc. ACE	41 - 50

Subject Advisors' Pseudonyms	Gender	Teaching Experience (years)	Experience in Subject Advisors' Post (years)	Reason for Appointment	Subject Specialisation	Qualifications	Age
				Qualification			

Table 4.5 shows subject educators' pseudonyms, gender, teaching experience and reason for appointment, subject specialisation, qualifications and age.

**Table 4.5: Demographic data for educators**

Educators' Pseudonyms	Gender	Teaching Experience (years)	Reason for Appointment	Subject Specialisation	Qualifications	Age
Themba	M	17	Experience, qualification	Mathematics, Chemistry	B.Sc. B.Ed. Honours	31 – 40
Mavis	F	23	Good results, qualification, experience	Mathematics, Physics	B.Sc. ACE	31 – 40
Jerome	M	6	Qualification, Love for teaching	Mathematics, Physics	B.Sc. PGCE	25 – 30
Albert	M	8	Qualification,	Mathematics,	B.Sc.	25 – 30

<b>Educators' Pseudonyms</b>	<b>Gender</b>	<b>Teaching Experience (years)</b>	<b>Reason for Appointment</b>	<b>Subject Specialisation</b>	<b>Qualifications</b>	<b>Age</b>
			Quality results	chemistry	PGCE	
Jessica	F	5	Volunteering Very good results	Geography, Business Studies	B.Ed.	25 – 30
Fionah	F	9	Qualification, experience	Chemistry, Physics	B.Ed.	31 – 40
Siyabonga	M	14	Volunteering Experience	English, Sesotho	Diploma ACE	31 – 40
Helen	F	17	Qualification, Experience	Mathematics, Natural Sciences	B.Ed. B.Ed. Honours	41 – 50
Khulekani	M	5	Qualification, Experience Good results	Mathematics Physics	B.Sc. B.Sc. Honours	25 – 30
James	M	12	Volunteering Experience	Life Sciences Natural Sciences	B.Ed.	31 – 40

#### **4.2.2 Biographical Data: Gender of Subject Advisors and Educators**

One of the issues in which the researcher was interested was the gender representation of the Mathematics subject advisors and educators. This was important because Mathematics departments in schools and subject advisors in district offices consist of male and female staff. Hence, it was interesting to find out about the leadership composition of the departments in schools and subject advisors in district offices in terms of gender. As advocated by Hall (1996) and Buregeya (2011), all men and women with the desire to lead should be encouraged to fulfil their potential. Data from the seven subject advisors reveal that three of the subject advisors were female while the other four were male. It also emerged that out of the ten secondary schools under investigation, four educators were females and six were males. Gender distribution was considered balanced in this study. In recognition of gender balance, the need to appoint male and female Mathematics subject advisors and educators is consistent with Buregeya's (2011) perspective that women who are employed in schools have the same intelligence, education and commitment as men. The subject advisors' gender composition in the schools visited challenges the argument by Leithwood and Jantzi (2008) that although women have made great strides in achieving higher positions within organisations, they are still underrepresented at higher levels of organisations. Even though biographical data was not included to answer any research questions, this data was crucial to the exploration of subject advisors' curriculum leadership because it enabled the current study to illustrate gender-balance in Mathematics subject advisors' curriculum leadership.

### **4.3 BACKGROUND, KNOWLEDGE, QUALIFICATIONS AND EXPERIENCES OF PARTICIPANTS**

#### **4.3.1 Background of Mathematics Subject Advisors**

##### **Subject Advisor 1: Marry**

Marry has had 17 years of teaching Mathematics in Grades 9 to 12. She holds a BEd. degree in Mathematics and Chemistry. In addition, Marry has an honours degree (BEd. Honours) in curriculum studies. Marry has been a subject advisor for 9 years. Before becoming a subject advisor, she was a post level one (PL1) educator

and because of her outstanding results, Marry was promoted to become an HoD. After three years, Marry managed to improve the results of the entire department. She was then requested by the district to assist with improving the district Mathematics results. She acted in the post for six months, the post was advertised, she applied, was invited for an interview, she attended and was appointed permanently. Marry believes that progressed learners are as a result of educators who are impatient with teaching learners and that every learner can achieve but the levels of achievement differ from one learner to another. She is of the opinion that Mathematics for All can be realised if educators can do their core business of teaching with love and patience. Marry supports schools by organising question papers from other provinces, sharing them with educators, networking with educators through WhatsApp, emails and telephones, organising content workshops for educators, team teaching and promoting educators to join other professional bodies such as Association of Mathematics Educators in South Africa (AMESA).

### **Subject Advisor 2: Charles**

Charles has had 23 years of teaching Mathematics in Grades 9 to 12. He holds a BSc. degree in Applied Mathematics. In addition, Charles has an Advanced Certificate in Education (ACE) with Mathematics and chemistry as major subjects. Before becoming a subject advisor, Charles worked for Eskom and was offered a part time job by his former high school principal to teach Grade 12. He did the job excellently because he the school achieved 94% in his first year and 100% in his second year of teaching Grade 12. Charles was then persuaded by the principal to do a course in education and the principal enrolled him for ACE. In his third year of teaching, he was appointed permanently and because of his passion of teaching Mathematics, he resigned from Eskom. Charles has produced a 100% pass rate for three consecutive years and it was upon this background that his services were requested at a district level. He then started conducting content workshops for educators and during the same year, and the overall district Mathematics results rose from 57.8% to 79.3%. The subject advisors' post was, therefore, created for him and he was appointed permanently. He believes that Mathematics for All can be realised once all educators are capacitated, motivated, committed and are willing to go an extra mile.

### **Subject Advisor 3: Veronica**

Veronica has been teaching Mathematics for 18 years to Grades 8 to 10 and she holds a BEd. degree in Accounting and Economics. Before becoming a subject advisor, Veronica was a Post Level one (PL1) educator for five years. Then she applied for an HoD post in another district, she was invited for the interviews and was appointed permanently. Three years later, she applied for a subject advisor post and she was invited for the interviews, and then appointed permanently. Veronica believes that even though she has not had teaching experience in Grade 12, her appointment as a subject advisor was influenced by her good results in her Mathematics department. She insists that the best strategies for leading Mathematics teaching and learning are empowering educators through content workshops, networking with performing schools (twinning), team work, motivating educators and learners, organising Mathematics Olympiads and quizzes. Veronica is of the opinion that educator support and professional development opportunities created by subject advisors are the backbone of improving learner achievement results in Mathematics. Veronica believes that Mathematics for All can be realised if all learners and educators are given the necessary support based on their needs. Veronica has been a subject advisor for ten years and she claims that her effective curriculum leadership skills are revealed by her district learner achievement results that have increased from 47.4% in 2015 to 55.6% in 2016, 63.2% in 2017 and 71% in 2018.

### **Subject Advisor 4: Paul**

Paul has been teaching Grades 8 to 12 for 21 years and holds a BSc. degree in mathematical statistics. Before becoming a subject advisor, Paul worked for Stats South Africa (Stats SA) and was offering extra classes to Grades 12 during weekends. Paul resigned from Stats SA and because of his love for teaching and learning, he became a full-time educator. He achieved quality results for three consecutive years during his first three years of teaching full time. He then registered to study for a Post-Graduate Certificate in Education (PGCE) taking two years to finish this qualification. Paul then applied for an HoD post, was invited for an interview and was then appointed permanently. Paul achieved major improvements in his Mathematics department during his first two years as an HoD and was then

requested to assist other schools in the district. He conducted workshops in fifteen schools that were struggling with poor Mathematics results and after his interventions, nine of the fifteen struggling schools improved by achieving a more than 23% pass rate. It was upon this background that the district appointed Paul as a subject advisor. He claims that there was no need for the Department of Basic Education to conduct interviews because his curriculum leadership proved beyond doubt that he was the right candidate for that post, needless to say that Paul was appointed as a subject advisor without going through any interview. Paul believes that learners have different cognitive abilities hence all learners can learn and they can achieve differently. He is of the opinion that all learners can pass when they are given enough support and care. In Paul's view, Mathematics for All can be realised, it is the resources, time and effort from educators, learners and parents that is needed.

#### **Subject Advisor 5: Thokozani**

Thokozani has been teaching Grades 8 to 12 for 26 years and holds a BEd. degree in Chemistry and Mathematics. Before becoming a subject advisor, Thokozani was a Post Level 1 (PL1) educator for five years. He achieved good results for two consecutive years during his last two years as a post level 1 educator. Thokozani applied for an HoD post, was invited for an interview and he was appointed permanently. He worked for six years as an HoD; however, he points out that learner achievement results did not improve significantly in his department. In his fourth year as an HoD, Grade 12 learner achievement results declined from 81% to 60.3%. Thokozani had to implement intervention strategies to support educators and learners, and the following year, results improved from 60.3% to 87.8%. Thokozani applied for a subject advisor post even though he doubted that he would make it to the interviews. He was invited for the interviews, went for the interviews and was appointed. Thokozani has been a subject advisor for 15 years. He is of the view that he does not know everything and hence he continuously attends developmental workshops and trainings in order for him to be capacitated so that he can also empower educators and learners. He claims that he is a lifelong subject advisor who has imparted this life learning ideas to his educators. He is of the opinion that not all learners can pass Mathematics and views Mathematics for All as something that cannot be realised. He insists that, one man can drive a horse to the river but twenty

cannot force it to drink water, it is all about the potential and the willingness of the learner.

### **Subject Advisor 6: Natasha**

Natasha has been teaching Mathematics to Grades 8 to 12 for 16 years. She holds a Bachelor's degree in Accounting. Natasha majored in Mathematics and Accounting up to third year university level. She also has a Post Graduate Degree in Education (PGDE) with Mathematics and accounting as her major subjects. Before Natasha became a subject advisor, she was a PL1 educator for three years. However, due to her results that were always good, she was promoted to an HoD post and for four consecutive years, her departmental results were all above 90%. She made it a point that all her learners participated in Mathematics competitions and Olympiads. She claims these competitions and Olympiads are the reason as to why the departmental results were always above 90% with Grades 8 and 9 also achieving well in the Annual National Assessments (ANAs). Natasha was then requested by the district to conduct educator-training workshops covering content challenges as well as methodological shortfalls. Natasha is of the opinion that Mathematics for All can be realised if educators and learners understand the importance of Mathematics for economic development in the twenty first century. She claims that the future will be dark without mathematicians and the standard of living will be poor due to lack of technological advancements.

### **Subject Advisor 7: Andrew**

Andrew has been teaching Mathematics to Grades 8 to 12 for 24 years. He holds a BSc. degree in Physics and Chemistry with Physics and Chemistry as major subjects. He also holds an Advanced Certificate in Education (ACE) majoring in Physical Science and Mathematics. Before Andrew became a subject advisor, he was a PL1 educator for four years. Due to his quality results, he was promoted to be an acting HoD during his second year of teaching. He claims that during his first year, he achieved a 98% pass rate and 100% pass rate consecutively in his second and third years of teaching. He then enrolled for an Advanced Certificate in Education in his fourth year of teaching which he successfully completed in one year. Andrew applied for a subject advisor post, was invited for the interview and was appointed permanently. He has been an acting HoD for two years and a subject

advisor for 18 years. He supports educators by outsourcing resources from other provinces such as question papers, lessons and videos. Andrew also conducts educator content training workshops covering content challenges, classroom management, learner discipline as well as strategies for assisting progressed learners. Andrew claims that he is a good curriculum leader because his district is the best according to 2018 Grade 12 Mathematics results. He is of the opinion that Mathematics for All can be realised because he capacitates and support his educators, who in turn empower learners. In his view, all learners can pass Mathematics; however, the levels of achievement differ from learner to learner because learners have different cognitive abilities.

#### **4.3.2 Background of Mathematics Educators**

##### **School A: Themba**

Themba has been teaching Mathematics to Grades 8 to 12 for 15 years and holds a BSc. degree in Physics and Chemistry. Apart from this, the participant also holds a Post Graduate Certificate in Education (PGCE) majoring in Mathematics and Chemistry. Themba is a post level one (PL1) educator. Themba is of the opinion that Mathematics for All cannot be achieved because learners have different cognitive abilities. He claims that his results are a testimony to this as he has some learners achieving above 75%, a few learners above 50%, but the majority achieve below 50% with more than half of these learners (majority) achieving below 30%. He believes that some workshops organised by the Department do not address educator and learner needs. He points out that learner achievement results in Mathematics remains low (59%) in his school despite having attended many educator professional development workshops. His wish is for these trainings and workshops to be conducted at schools so that the subject advisors can demonstrate better methodologies that accommodate progressed learners.

##### **School B: Mavis**

Mavis has been teaching Mathematics to Grades 9 to 12 for 12 years and has been an HoD for 4 years and holds a B.Ed. degree in Mathematics and Natural Sciences. Mavis also has an honours degree in Mathematics with Mathematics and Statistics as major subjects. Before she became an HoD, Mavis was a Post Level One (PL1) studying Honours part time, then applied for an HoD post, was called for an interview

and subsequently appointed permanently based on the participant matric results that were always good. She claims that hard work pays, even though there were senior and more experienced educators who were invited for the interviews, she says, “I outclassed them because I was shouting results as opposed to plans.”

### **School C: Jerome**

Jerome has been teaching for 7 years to Grades 8 to 12 and holds a BSc degree in Mathematics and Physics. Before Jerome became an educator, Jerome worked for Anglo Platinum, offering classes to Grade 12 learners during weekends. He fell in love with teaching and was advised to do a Post Graduate Certificate in Education (PGCE) by the school principal. Jerome enrolled for a PGCE course and after six months, Jerome was called for an interview and was appointed permanently. Jerome believes that Mathematics is a challenging subject for learners and learners who need help are invariably often absent from school and they also do not attend extra classes due to lack of motivation.

### **School D: Albert**

Albert has been teaching Mathematics to Grades 10 to 12 for 8 years. Albert holds a BSc. degree in Mathematics and Chemistry. In addition, Albert also has a Post Graduate Certificate in Education (PGCE). Before becoming an educator, Albert was doing Honours in Mathematics and then became a teach South Africa (Teach SA) educator without teaching qualifications. Albert then enrolled for a PGCE which he completed in 2018. According to Albert, his results were always of a high quality and hence he only enrolled for PGCE in 2017. Apart from this, Albert believes he is given enough support and development opportunities by his subject advisor. Albert claims that the outstanding support from the subject advisor is the reason why the schools' Grades 8 and 9 Mathematics results are very good. For the past four years, the school has achieved above 90% pass rate in Mathematics for both Grades 8 and 9.

### **School E: Jessica**

Jessica never majored in Mathematics but she holds a BEd degree with Geography and Business Studies as major subjects. When Jessica came to the school, there was need for a Mathematics educator and she volunteered. She then started teaching Mathematics to Grades 8 and 9 and has done so for 5 years. Jessica

mentions the outstanding support that she gets from her subject advisor as scaffolding for her good results in both Grades 8 and 9 Mathematics. Moreover, Jessica points out that she has very close contact with other colleagues in the district who assist her. The outstanding support from the subject advisor is the reason why the schools' Grades 8 and 9 Mathematics results are very good with the school achieving above 75% pass over a three-year period. Jessica believes that Annual National Assessment (ANA) tasks are of a good standard and she exposes her Grade 9 learners to them.

### **School F: Fionah**

Fionah has been teaching Mathematics to Grades 8 to 12 for 9 years and has been the HoD of Mathematics for 5 years. Fionah holds a B.Ed. degree in Natural Sciences and majoring in Chemistry and Physics. Fionah was a PL1 before becoming an HoD, when the post was advertised. Fionah applied, was called for an interview and then appointed permanently. Fionah believes in the three Gs when it comes to Mathematics teaching and learning, you have to be there first, get them in class, get teaching them, and get them out.

### **School G: Siyabonga**

Siyabonga has been teaching for 14 years but has never taught Mathematics even though he has been the Mathematics HoD for 10 years. Siyabonga holds a diploma in education and an Advanced Certificate in Education (ACE) with English and Sesotho as major subjects. Before becoming an HoD, Siyabonga was a PL1, and then became an acting HoD, the post was advertised, and the participant applied, was invited for an interview telephonically and was appointed permanently. Siyabonga views educator appraisal as a waste of time since he is not familiar with the processes of integrated quality management systems (IQMS). The educators only get involved in appraisal when the forms are required by the district offices and after completing and submitting the educator professional growth plans (PGPs). Siyabonga never discusses the PGPs with the involved educators; they simply stay on paper. Siyabonga believes that the best strategies for leading Mathematics are leading by being exemplary, that is, attending extra classes, giving learners enough homework and assignments following Blooms' taxonomy in order to accommodate learners' different cognitive abilities.

**School H: Helen.**

Helen has been teaching for 17 years, teaching Mathematics for 15 years to Grades 8 to 12. Helen has 13 years' experience as an HoD and holds a B.Ed. degree in Mathematics and Natural Sciences. Helen also has an Honours degree in education management. Before becoming an HoD, Helen was a PL1 for three years, then applied for HoD post and was appointed permanently. Helens' belief is that the best strategies for leading Mathematics in the school are ensuring that both educators and learners are motivated, taking learners for excursions where they see application of Mathematics in real life situations, integrating theory with practice; for example, when introducing a chapter, she tells learners where they can apply and use that chapter (knowledge) in real life situations. The participant views the above strategies as specifically good strategies because they motivate learners and the individual needs of educators and learners are addressed thereby resulting in an increase in learner achievement. Helen views her subject advisors' support as the main reason why the schools' pass rate in Mathematics has been above 90% for six continuous years.

**School I: Khulekani**

Khulekani has been teaching Mathematics for 5 years to Grades 8 to 12. Khulekani holds a BSc degree in Mathematics and Physics. Moreover, Khulekani also holds an Honours degree in Physics. Before Khulekani became an educator, he was studying for a Master's degree in Physics and was offering classes to Grade 12 Mathematics learners during weekends. He was then recruited to Teach South Africa (Teach SA) because of his love for Mathematics teaching. Khulekani has achieved quality results to the school for the past four years. In his first year of teaching Grade 12, he achieved a 95% pass rate, in his second year, 98%, third year 100% and in his fourth year he achieved a 100% pass rate. He views Mathematics teaching and learning as directly proportional to educator competency, commitment, attitude, knowledge and interactions with other colleagues as well as subject advisors. Khulekani is not professionally qualified (does not have a Post Graduate Certificate in Education) and does not intend to register for PGCE any time soon.

## **School J: James**

James has been teaching for 12 years and has been teaching Grades 9 to 12. James holds a B.Ed. degree in Natural Sciences and Life Sciences. He has been an HoD for Mathematics in School J for 7 years. Before becoming an HoD, there was need for the school to have an HoD for Mathematics and James volunteered to act in the HoD post without being remunerated. When the post was advertised, James applied, was invited for an interview telephonically, attended the interview and was appointed permanently. James believes that he is not getting enough support from the subject advisor hence his department has been underperforming for the past 3 years. He claims that his subject advisor visits the school twice in a year and when the subject advisor is at the school only asks for learner workbooks and the educator files. The subject advisor will request a cup of tea, sit in the staffroom, go through learners' workbooks, educator files and then leave a report. This report is never followed up at all and when the subject advisor comes again, the same thing happens again. For the past three years the results in Grade 12 Mathematics have been 45%, 51% and 25% respectively. James did not major in Mathematics hence he claims that the entire Mathematics department relies on the support of the subject advisor.

### **4.4 EMERGING THEMES AND SUB-THEMES**

The interviews were transcribed and the data then coded and categorised into themes, as claimed by Kombo and Tromp (2009). Once each interview was transcribed, they were returned to the interviewees to check for content accuracy before the data were analysed. In line with the study's objective, each transcript was then coded utilising predetermined themes, which emerged as units of analysis (Lincoln, 2005) such as curriculum leadership practices of subject advisors, educator professional development, perceptions of educators on the curriculum leadership role of subject advisors, and successes, opportunities, challenges as well as suggestions to improve the curriculum leadership role of mathematics subject advisors. In order to increase trustworthiness, which is considered by Mafuwane (2011) as providing as much detail for the reader, the data were presented as thick descriptions. Member checks were made through revisits with the aim of corroborating interview interpretations with what was communicated by participants

(Bogdan & Biklen, 2007). Before both the analysis and final report were executed, the participants were asked to verify, correct as well as elaborating on emerging themes and supporting quotations.

Table 4.6 outlines the themes, sub- themes and categories that emerged from the data.

**Table 4.6: Themes, sub-themes and categories identified in the data**

<b>Research Question</b>	<b>Theme</b>	<b>Sub-theme</b>	<b>Category</b>
1. What is the policy and/or regulatory framework that guides and/or regulates the functions of subject advisors in curriculum leadership and support in South Africa?	1. Policy and/or regulatory framework that guides and/or regulates the functions of subject advisors in curriculum leadership and support in South Africa	1. Policy and programme review	<ol style="list-style-type: none"> <li>1. Curriculum reforms and Mathematics for All</li> <li>2. National and provincial test programmes</li> <li>3. Progression and modularisation policy</li> <li>4. Employment of Educators Act (EEA) and Personnel Administrative Measures (PAM)</li> </ol>
		2. Knowledge of the curriculum, skills and learning programmes	<ol style="list-style-type: none"> <li>1. Curriculum knowledge and learning programmes</li> <li>2. Knowledge of educators</li> <li>3. Contextual Knowledge</li> <li>4. Conceptual knowledge and educational practice</li> <li>5. Knowledge of the processes</li> <li>6. Knowledge of control</li> <li>7. Skills</li> </ol>
2. How do subject advisors, across a variety of contexts in South Africa, understand and go about implementing their roles in curriculum leadership and	2. The manner in which subject advisors, across a variety of contexts in South Africa, understand and implement their roles in curriculum leadership	1. Subject advisors' perceptions	<ol style="list-style-type: none"> <li>1. Perceptions of subject advisors on their appointments</li> <li>2. CAPS and Mathematics for All</li> <li>3. District strengths</li> <li>4. District weaknesses</li> <li>5. Initial subject advisors' training</li> </ol>

<b>Research Question</b>	<b>Theme</b>	<b>Sub-theme</b>	<b>Category</b>
support for the improvement of Mathematics instruction?	and support for the improvement of Mathematics instruction.		
		2. Managing the curriculum and leading initiatives	<ol style="list-style-type: none"> <li>1. Creating conditions needed for effective teaching and learning</li> <li>2. Educator participation and learner assessment</li> </ol>
		3. Subject advisors' roles	<ol style="list-style-type: none"> <li>1. Evaluation of educators</li> <li>2. Mentoring of educators</li> <li>3. Monitoring and controlling educators and learners' workbooks</li> <li>4. Observation of educators</li> <li>5. Subject advisors as visionary leaders</li> <li>6. Educator professional development</li> </ol>
		4. Challenges and opportunities facing subject advisors' curriculum leadership	<ol style="list-style-type: none"> <li>1. Challenges facing Mathematics for All</li> <li>2. Challenges posed by progressed learners</li> <li>3. Challenges perceived with educator professional growth</li> <li>4. Challenges with discipline</li> <li>5. Opportunities facing subject advisors' curriculum leadership</li> </ol>

<b>Research Question</b>	<b>Theme</b>	<b>Sub-theme</b>	<b>Category</b>
3. How can we construct a theoretically sound account to explain the understandings and implementation practices of Mathematics subject advisors in South Africa?	3. Constructing a theoretically sound account explaining the understandings and implementation practices of Mathematics subject advisors in South Africa	1. District logistics	<ol style="list-style-type: none"> <li>1. Internal logistics of the districts</li> <li>2. Structures of the districts</li> <li>3. School conditions</li> </ol>
		2. Means of curriculum leadership influence	<ol style="list-style-type: none"> <li>1. Educator professional development</li> <li>2. District subject meetings</li> <li>3. Feedback and evaluation</li> <li>4. Supervision</li> </ol>

## **4.5 PRESENTATION AND ANALYSIS OF THE FINDINGS**

In this section, the key themes and findings relating to the roles, perceptions, understanding, beliefs and interpretation are presented, as communicated by the participants in relation to Mathematics subject advisors' curriculum leadership role for Mathematics improvement in South Africa.

### **4.5.1 Theme 1: Policy and/or Regulatory Framework that guides and/or regulates the Functions of Subject Advisors in Curriculum Leadership and Support in South Africa**

In attempting to answer the research question of the policy and/or regulatory framework that guides and/or regulates the functions of subject advisors in curriculum leadership and support in South Africa, the following sub-themes and categories emerged:

#### **4.5.1.1 Sub-theme 1: Programme review and policy**

The following categories emerged when subject advisors were asked about policy and programme review:

##### **4.5.1.1.1 Category 1: Curriculum reforms and Mathematics for All**

Most of the subject advisors interviewed were conversant with curriculum reform. When asked about the Mathematics for All campaign, responses were varied, but all participants stated that they heard the Mathematics for All campaign from the MEC. However, they had mixed feelings about curriculum reform, as voiced by Marry:

*I am of the opinion that Mathematics for All can be realised if educators can do their core business of teaching with love and patience. Natasha had the same sentiments by pointing out that: In my views Mathematics for All can be realised if educators and learners understand the importance of Mathematics in economic development in this fourth industrial revolution.*

Thokozani had a different view, he stated: *I am of the opinion that not all learners can pass Mathematics and I view Mathematics for All as something that can't be realised. Mr Sithole, one man can drive a horse into the river but twenty cannot force it to drink water, it's all about the potential and the willingness of the learner. Charles stated that: No. Mathematics can't be for all; learners have got different cognitive*

abilities. It is only for the elite. Even in the Bible Mr Sithole, it is written that, “many are called but few are chosen”. Mathematics can’t be for all. This viewpoint was echoed by the participant at School J, who stated that, *Mathematics will never be for all. Not every learner will become a doctor, scientist or engineer. What about shelf packers in shops? I am saying learners who can’t do Mathematics like progressed learners let them do mathematical literacy.*

#### **4.5.1.1.2 Category 2: Provincial and national test programmes**

When participants were asked how they thought the national and provincial test programmes influenced the teaching and learning of Mathematics, their responses were varied and there was consensus that they are good because they set the benchmarks and the standards of what a learner is supposed to know. On the other hand, educators are pressurised into hastily completing the syllabus rather than working systematically through it, leaving many learners behind. This is a serious challenge to progressed learners. They are demotivated after writing these national papers. This is best illustrated by the response of Marry, who stated: *Educators rush to finish the curriculum (work schedule) without really having reached learners enough and in most cases, the majority of learners are left behind. Remember, its learners who are supposed to cover the curriculum as opposed to educators. During moderation of informal class tests and examinations, I always realise that learners did not cover the work schedule, even though educators would have filled in the work schedule completion dates.* Andrew had a different view: *They are instrumental in setting the standard and this is good for learners to get used to such a high standard at an early stage. Besides this, they also give a true reflection of best achieving learners because learners are exposed to the same standard of assessment provincially or nationally.*

#### **4.5.1.1.3 Category 3: Progression and modularisation policy**

Subject advisors have developed intervention strategies for assisting progressed learners to achieve more in Mathematics. This was evidenced by Thokozani who stated: *Sir, I need to come up with intervention strategies of assisting progressed learners to pass.* When probed about progressed learners his response was: *Some matriculants were condoned through the grade progression policy by the Department of Basic Education. The policy allows learners who are of an old age to be promoted*

*to the next class, though they do not meet the promotion requirements and those who failed twice in a grade. Natasha seemed to have similar sentiments about progressed learners but did explain that: more than four thousand learners in the Free State province have been attending organised workshops and camps throughout the years 2015 to 2019 in order to help them prepare for their end of year examinations.*

Marry had a different view, she stated: *Although I have got progressed learners, I am not worried because at the end of the year not all of them will write the Mathematics examination. When asked the reason for this, she responded that: There is a policy on progression and modularization. The policy states that only those progressed learners who are performing may write their end of year examinations. This is determined after term 3 examinations. Andrew had a different view about progressed learners, he stated: Even though there is a policy on progression and modularisation of learners, according to this policy, progressed learners who are not passing Mathematics may opt to write in June the following year. When probed, he explained that: The process of modularisation is a consultative one. You need to consult with the learner, the parent, principal and educator. The final word lies with the learner. In this case, the learner may still write Mathematics even if he or she has been failing throughout the year. To be very open with you Mr Sithole, modularisation does not assist because the learner has the final word. Most learners who did not do well in Mathematics are progressed learners for the past three years.*

#### **4.5.1.1.4 Category 4: Employment of Educators Act (EEA) and Personnel Administrative Measures (PAM)**

When subject advisors were asked about the policies and regulatory framework that guides their curriculum leadership role, most of them pointed to the EEA (Employment of Educators Act) document. Charles stated: *I am guided by the EEA policy document. The document outlines my duties and responsibilities as a subject advisor. Marry had the same view and responded: My work is guided by the Employment of Educators Act, 64 (1998). In terms of this Act my job is dependent on the approaches and the needs of a particular province, district or school. When asked about the nature of her work, she stated: My work is not limited to administration, teaching, personnel management, extra and co-curricular activities and communication. Andrew had a different view and stated: My job is guided by the*

*Personnel and Administration Measures (PAM) document. My core duties are clearly defined in the PAM document. When probed about the PAM document, his response was: I did not get the PAM document from the CES or HR, I had to google and download the document from the internet. Natasha had the same view, she stated: From my knowledge, my job is guided by the two documents the EEA and the PAM document. My duties and responsibilities are clearly stated in these two documents. When asked about how she came to be aware of the two documents, her response was: My colleague from Gauteng sent me the documents through an email and also gave me the website where the two documents can be located on the internet.*

#### **4.5.1.1.5 Summary of sub-theme 1**

From the above conversations, it became evidently clear that none of the subject advisors was given the policies and regulatory framework that guides their curriculum leadership role by either the district or provincial offices. Subject advisors had to network with other colleagues or using the internet to search for these two documents, the EEA and the PAM. Theme one established that subject advisors' curriculum leadership is regulated and guided by curriculum reforms, that is, CAPS and Mathematics for All, national and provincial test programmes, progression and modularisation policy which talks about progressed learners and the Employment of Educators Act and Personnel Administrative Measures document. Currently in the certain schools, extra classes are designed and targeted for progressed learners and these extra classes represent intensive teaching to assist progressed learners so that they can be on par with other learners (DBE, 2015).

#### **4.5.1.2 Sub-theme 2: Knowledge of the Curriculum, Skills and Learning Programmes**

##### **4.5.1.2.1 Category 1: Curriculum knowledge, skills and learning programmes**

Skills, knowledge and personal characteristics of the subject advisors relate to their age, level of education, time spent in the post, qualifications as well as past experiences of teaching Mathematics. This is captured in Mavis' words: *Hard work pays, even though there were senior and more experienced educators who were invited for the interviews, I outclassed them because I was shouting results as opposed to plans.* The above words suggest that the time spent in the post is not the

only factor to be considered when appointing subject advisors. Other factors such as the history of educators' results in a subject and content knowledge also play a role.

Andrew also shared the same opinion when he stated that: *I conduct educator content training workshops covering content challenges, classroom management, learner discipline as well as strategies for assisting progressed learners. Mr Sithole I am a good curriculum leader because my district is the best according to November 2018 Grade 12 Mathematics results.* In addition, they relate to the knowledge, skills, attitudes and commitment of subject advisors towards curriculum leadership (Turner & Bolam, 1998). This is best illustrated by Paul who claimed that: *Educator professional development is priority number one in my curriculum leadership. At times, I train educators and attend content workshops even though I am sick. Mr Sithole, you remember that in June I requested you to train educators on my behalf because I was not feeling well. In fact, I was booked off by my medical doctor during that week, but I had to attend the workshop.*

I want to concentrate mainly on subject advisors' professional knowledge, since I am convinced that it is professional knowledge used by subject advisors as leaders of the curriculum. This is evidenced by Natasha who stated that: *I always encourage and advise my educators to teach for conceptual understanding.* It was important to relate subject advisors' views in connection to subject advisors' role as curriculum leaders in facilitating and promoting effective teaching and learning of Mathematics to a suitable theoretical framework and hence cognitive theory was applied. In so doing, cognitive theory sheds light on the attitudes, ideas, perceptions and understanding of subject advisors' reform policies hoping to get a deeper understanding of the influence of subject advisors' curriculum leadership on educators' teaching practices and the impact it has on learner achievement.

It was evident from the collected data that subject advisors viewed curriculum delivery as their foremost priority. Types of curriculum knowledge identified by the participants include conceptual understanding of Mathematics, and attitude towards Mathematics, content knowledge and classroom practices. Participants reported having high expectations of both educators and learners; both groups had to exhibit commitment to learner achievement and effective teaching and learning and they had to ensure that the curriculum promoted learners' achievement effectively, and

that educators had a sense of understanding and knowledge of Mathematics Maphosa et al (2013) states that subject advisors and educators must possess knowledge of their subject areas to possess good leadership and management. Subject advisors encouraged educators to plan lessons together and this activity addressed learner's needs. Marry explained her role:

*I support schools by organising question papers from other provinces; share them with educators, networking with educators through WhatsApp, emails and telephones, organizing content workshops for educators, team teaching and promoting educators to join other professional bodies such as Association of Mathematics Educators in South Africa (AMESA). The subject advisors interviewed had a strong content knowledge of Mathematics and most had majored in the subject. Evidence suggested that subject advisors encouraged educators to engage learners in high-level thinking skills by encouraging them to participate actively in class discussions. During observations, it was noted that learners were provided with support until they could perform tasks on their own. Andrew stated: *I help my educators to develop skills that assists them in delivering the curriculum in the most effective and efficient ways utilising the available resources. Moreover, I support and assist educators in curriculum interpretation as well as lesson preparation, lesson presentation and learner assessment.**

Some educators did not feel comfortable working with the deeper and higher cognitive levels of assessment benchmarks, because they lacked content knowledge. This resulted in their failure to cover the curriculum and, consequently, educators in the next grades had to spend a great deal of time teaching concepts that learners should have mastered in previous grades. Although subject advisors should assist educators in creating new knowledge and skills that ensure that their schools are at the maximum operating level, as maintained by Sallis and Jones (2002:24), there were challenges encountered by participants in attempting to keep up with all the changes and increasing demands of curriculum leadership. Veronica admits that: *Even though I was not having teaching experience for Grade 12 Mathematics, my appointment as a subject advisor was influenced by my good results in my Mathematics department.* Even though the participant at School E had not majored in the subject, she was appointed to serve as HoD. The same applied to the participant at School G, who confirmed that: *Although I am the appointed HoD for*

*Mathematics, geography and business studies were my major subjects. When I came to this school, there was need for a Mathematics HoD and I volunteered, I never taught Mathematics in my life. However, I have very close contact with other colleagues in the district who assist me. The outstanding support received from the subject advisor is the reason why our results at the end of the year are very good. For the past four years, we have been achieving above 80% pass rate.*

Lack of support from the district also made it difficult for subject advisors to perform their curriculum leadership; Marry stated: *“I need training on how to assist educators to be patient with progressed learners. I also need support on best ways of assisting progressed learners to achieve more in Mathematics”*. The participant at School D also pointed out that training comprised of discussing Mathematics content knowledge, assessment, and classroom management as well as teaching strategies. However, after educators receive training; there are no follow-ups on educators’ work. This is best illustrated by Themba, who stated: *Learner achievement results in Mathematics remains low (59%) in my school despite having attended several educator professional development workshops. Mr Sithole, this year alone I attended five workshops. My wish is for these trainings and workshops to be conducted at schools so that the subject advisors can demonstrate better methodologies that accommodate progressed learners.*

Subject advisors reported that they maintained ongoing conversation with educators about the manner in which curriculum and teaching methods needs to be communicated and connected with educators’ every day teaching practices. Participants’ response also showed their continuous engagement in making decisions related to teaching and learning of Mathematics. Participant at School F reported that school management team (SMT) meetings were held every weekday morning, and that team members discussed new developments in teaching, curriculum coverage, learner achievement, learner discipline and absenteeism. In contrast, the participant at School A challenged this view by stating: *As an educator, I am not involved in the drafting of the school’s performance management policies. I know the potential of my learners in this school; however, I have little say in setting learner achievement targets. The subject advisor is running the show alone. All that he does is dictating to me unrealistic targets. Mr Sithole, I am really stressing because my learners will never give me 95% pass rate and an average of 50%. This*

sentiment was shared by School J's participant, who, in expressing his dissatisfaction, said: *If I can be involved in the setting of school targets, I would be more satisfied and would be motivated to perform better because there will be collective ownership of school targets.*

Participants reported an increase in enrolment of learners taking Mathematics from Grades 10 to 12, a consequence of the Member of the Executive Council's (MEC) Mathematics for All campaign. In addition, participants reported that condoned (progressed) learners, that is, learners who have failed Grades 8,9,10 or 11 but are promoted to the next grade due to age, posed a challenge to their curriculum leadership, thereby hindering effective teaching and learning of Mathematics, resulting in poor learner achievement. Marry blamed this poor learner achievement on ineffective educators who, protected by their unions, refused to attend weekend and holiday classes without additional remuneration. She stated: *I believe that progressed learners are as a result of educators who are impatient with learners and that every learner can achieve but the levels of achievement differ from one learner to another. I am of the opinion that Mathematics for All can be realised if educators can do their core business of teaching with love and patience.* Natasha had a different view, she stated: *What do you expect if unions do not encourage educators to go an extra mile even without additional remuneration? Progressed learners will remain in the system as long as educators are supported by their unions. Right now, the slogan of SADTU in my district is: to all our union members, no additional pay, no extra classes.* Subject advisors need to use their knowledge of the curriculum and learning programmes to the advantages of learners. They should try to work with unions, district department officials and policy makers to improve the quality of teaching and learning of Mathematics. The unions and department officials should try to come together and agree on ways of meeting the demands of educators without compromising learners' basic right to access quality teaching and learning.

#### **4.5.1.2.2 Category 2: Knowledge of educators**

Generally, subject advisors want to use educators in the most efficient and effective ways within the boundaries of the school timetable and during extra classes (weekends, holidays, for example). Subject advisors depend on their knowledge of educators' strengths, personalities, and attitude towards schoolwork, weaknesses and commitment. Subject advisors acquire this information in different settings such

as departmental meetings, formal classroom lesson observations, and informal meetings during break, lunch or after school hours, educators' attendance, and willingness of educators to conduct extra classes during weekends and holidays and learner achievement results.

Besides this, subject advisors even consult other educators to enrich their knowledge about individual educators in the district. As stated by Thokozani: *I do not know everything and hence I continuously attend developmental workshops and trainings in order for me to be capacitated so that I can also empower educators and learners. I am a lifelong subject advisor who has successfully imparted this life learning spirit to my educators. I have created a platform where educators in my district are free to approach me and disclose the challenges that they encounter during teaching and learning of Mathematics. Few of my educators are still having content challenges and others have challenges of memo interpretation.* Andrew had a similar view when he stated that: *I know my educators in this district very well. Based on educator needs, I conduct educator content training workshops covering content challenges, classroom management, learner discipline as well as strategies for assisting progressed learners to achieve more in Mathematics.*

This knowledge about individual educators may be referred directly or indirectly by subject advisors when working in a variety of settings. The settings may include classroom observations, the subject advisor as role model, such as educators observing the subject advisor teaching, subject advisor doing educator appraisal, subject advisor coaching and mentoring educators, discussions of work schedule, curriculum coverage, content workshops as well as working with conflict and managing it. As claimed by Sailors and Shanklin (2010), knowledge about people can be disorganised, random and in most cases, implicit because it is subconsciously absorbed on a daily basis. Coleman (2001) points out that knowledge of people is acquired largely unintentionally as a by-product of encounters having other purposes. As advocated by Turner and Bolam (1998) as well as Nkambule and Amsterdam (2018), this knowledge can be improved by seeing educators in different settings such in the classrooms, socially inside as well as outside school premises and formal meetings. Consequently, Mathematics subject advisors may become more aware of educators' training and development needs with the hope of improving educators' professional understanding of effective

teaching and learning and educator-subject advisor contacts and feedback sessions may provide useful information concerning an educators' morale or educators' perceived lack of career progression.

#### **4.5.1.2.3 Category 3: Contextual Knowledge**

The contextual knowledge of curriculum leadership was seen as an important key in understanding subject advisors' curriculum leadership. Contextual knowledge is best used in district meetings, for instance, strengths and weaknesses of educators and classroom settings such as the shortcomings and challenges due to the restricted resource availability. This is best illustrated by a participant from school D, who complained: *Mathematics for All will never be realised in this school because of shortages of resources. Mr Sithole, can you believe that I am the only Mathematics educator in this school? I am teaching Grade 8 to 12 Mathematics. I would really appreciate if the principal can hire another mathematics educator. I also have textbook challenges in Grades 9 and 10. I am really burning out because every grade needs extra class.*

In addition, knowledge of the school culture, priorities and school values are included in contextual knowledge of subject advisors. This is best illustrated by the response of Paul who reported on the best strategies for leading Mathematics in the district: *I ensure that both educators and learners stay motivated. I organise district trips for learners to go for excursions where they see application of Mathematics in real life situations. I encourage and advise my educators to integrate theory with practice – that is, when introducing a chapter, educators must tell learners where they can apply and use that chapter (knowledge) in real life situations. Besides this, I also encourage schools to camp learners in my all my school. Currently twenty-nine schools out of 37 schools are camping learners; learners come to school and sleep at school from Monday until Saturday. On Sunday, learners are given time to go to church, see their parents and come back to school at 17:00hrs. Learners are taught and they do question papers during camps.*

Much, but not all of contextual knowledge is consciously held even though it is rarely written down and will usually contain strong personal elements (Turner & Bolam, 1998). Subject advisors refer to contextual knowledge when discussing views and ideas on working with learners, educators or parents. In addition, contextual

knowledge was used when discussing the requirements for special facilities, deployment and redeployment of educators, timetable restrictions as well as resource availability and allocation thereof. Other departmental policies towards discipline, assessment, homework and management of progressed learners were seen as pivotal components of subject advisors' contextual knowledge informing subject advisors' curriculum leadership practices.

#### **4.5.1.2.4 Category 4: Conceptual knowledge and educational practice**

Subject advisors, as subject experts, were found to have the necessary skills, strategies as well as methodologies and well-developed updated curriculum developments and knew the importance of educator professional development. Educational practice knowledge is important when making decisions with for instance, curriculum changes. At the heart of all these varied aspects are the personal beliefs and values of the subject advisors, which ultimately influence subject advisors' attitude towards educators and perceptions of educators' classroom practices. According to Nkambule and Amsterdam (2018), conceptual knowledge is a set of theories stored in the memory and used to analyse issues, problems and policies. There can be problems however, in the transfer of ideas from one setting to another. This occur when subject advisors attend district and provincial workshops and are made aware of better techniques of leading and managing districts, as well as better teaching and learning techniques but they fail to incorporate and integrate the information in schools. As pointed out by Andrew: *As for the challenges, time is a problem, most of these workshops are done after school hours and during weekends and educators have commitments after school. Some educators are very loyal to their unions, that is, SADTU (South African Democratic Teachers Union). They don't work after normal working hours without additional remuneration. We are therefore, forced to have workshops during the week and this disrupts effective teaching and learning in schools.*

In contrast, the participant at School D had good working relations with departmental staff members. The participant created time for IQMS and educator appraisal during his free periods and after school hours. This is best explained by the participant's response: *I squeeze leadership activities that are educator appraisal during my free periods and sometimes after school hours. During my free periods, I also move*

around checking for learners who are outside and take them back into their classrooms. Siyabonga claims that *some workshops are time wasting: I have been attending workshops for more than ten years now. My experience of these workshops has taught me that attending district workshops is inversely proportional to learner achievement results in Mathematics. The more I attend, the more learners fail and vice versa.* This inevitably leads to conceptual knowledge being applied ineffectively. Learning about leadership change and management for example, does not guarantee that subject advisors will be able to manage and lead well in the context within which educators operate, as claimed by Turner and Bolam (1998).

#### **4.5.1.2.5 Category 5: Knowledge of the processes**

At the heart of process knowledge is the understanding of knowing what has to be done and planning to do it. This is best illustrated by the response of Charles, who stated: *I encourage my educators to teach learners basics first. Teamwork is the glue that binds educators in my district, for example, team teaching is the backbone of our success in the district. In my district, educators plan together, teach together and do their own reflections in their respective circuits (municipalities).* Natasha also shared the same view and reported: *I develop my educators being informed by their needs identified from IQMS as well as offering support in areas where educators have content challenges and even social problems. I have referred three educators to the employee wellness section in my district last year. Two of the educators are responding very well as evidenced by their improved attitude towards their schoolwork; the other educator still needs more time for him to change. Remember Mr Sithole that I was a teacher before becoming a subject advisor; I demonstrate to educators how to teach challenging content areas.*

Knowing processes such as team building, organising, planning, controlling and leading the curriculum are important for effective subject advisors' curriculum leadership. Process knowledge includes a wide range of skills such as allocating educators effectively within the constraints of the available human resources, as well as dealing with school challenges.

#### **4.5.1.2.6 Category 6: Control of knowledge**

Control of knowledge is based on the individual subject advisors and it includes knowledge of one's own knowledge as well as skills, the place and manner to use

them as well as when to look beyond one's own available resources. The most important aspect of control of knowledge is being aware of one's own particular strengths and weaknesses. This is illustrated by the response from a participant at School J: *Although I am the HoD of Mathematics, Geography and Business Studies were my major subjects. When I came to this school, there was need for a Mathematics HoD and I volunteered. I never taught Mathematics in my life. However, I have very close contact with other colleagues in the district who assist me. The outstanding support from the subject advisor is the reason why our results of the year are very good. For the past six years, we have been achieving above 85% pass rate.*

Thus, subject advisors need control of knowledge when thinking about the best ways of proposing efficient and effective use of educators and other resources in the teaching and learning of Mathematics. A case in point is when the HoD did not major and specialise in Mathematics while other educators in the department specialised in Mathematics. Therefore, the subject advisor must encourage the HoD as a curriculum leader to delegate duties and responsibilities to more experienced, expert educators as well as those who specialised in Mathematics.

#### **4.5.1.2.7 Category 7: Skills**

Subject advisors as leaders of the curriculum demonstrate the following skills, leadership, decision-making, communication and management. These skills are based on the competency levels of the subject advisors and if subject advisors are to make a difference within their districts; for example, improving the quality of teaching and learning, which in turn influences learner achievement, then an over-reliance on subject advisors' competency alone may not be adequate. This is illustrated in the response of Marry, who reported that: *In order to make my schools perform and improve learner achievement results in Mathematics, I maintain close relationships between the internal and external environments to meet both educator and learner needs. I set targets and standards for both educators' and learners' achievement and then work as a team to ensure that the targets are met. In my district, effective teaching and learning is priority number one and I encourage my educators to involve learners actively during teaching and learners.* Some of the subject advisors

in this study noted the lack of time to reflect on the manner in which they lead and manage their districts, as they would like due to heavy workloads.

This is best illustrated by Marry who stated that: *I have 49 secondary schools that I am working with. All these secondary schools are offering Mathematics from Grades 8 to 12. Even though I am only controlling and moderating the FET (Further Education and Training) band, Grades 10 to 12, the workload is seemingly becoming unmanageable and this is coupled with shortages of transport in my district. I would really appreciate if the Department can avail transport so that I can control, moderate and advise according to my year plan.* These skills are almost entirely on learning from experience, with only occasional references to theoretical learning.

#### **4.5.1.2.8 Summary sub-theme 2**

From the above theme, it became clear that skills, knowledge and personal characteristics of the subject advisors, background of education, experience in the post, qualifications and previous experience of teaching Mathematics plays a pivotal role in subject advisors' curriculum leadership. In addition, subject advisors' curriculum leadership is influenced by subject advisors' knowledge, skills, attitudes and commitment of subject advisors towards their job as curriculum leaders.

### **4.5.2 Theme 2: The manner in which subject advisors, across a variety of contexts in South Africa, understand and implement their roles in Curriculum Leadership and Support for the Improvement of Mathematics Instruction**

The following sub-themes emerged in attempting to answer this research question:

#### **4.5.2.1 Sub-theme 1: Subject advisors' perceptions on their expected curriculum leadership role**

The following categories emerged from this sub-theme:

##### **4.5.2.1.1 Category 1: Perceptions of subject advisors on their appointments**

According to Taylor (2008), subject advisors are the backbone in the running of successful schools. Knowing subject advisors' pivotal roles, their appointments should be carefully planned with a view of recruiting the most suitable individuals. Based on this, it was critical to understand the way in which the subject advisors in

this study were appointed even before commencing the exploration of the Mathematics subject advisors' curriculum leadership role. As a result, the researcher sought views and perspectives relating to the appointment of subject advisors. To further deepen understanding, the researcher consulted literature, as cited in Chapter 2 and then began conversations with the subject advisors by exploring their appointments and qualifications for the position, hoping to find out what qualifies them for their curriculum leadership role.

Findings by Miller *et al.* (2010) show that subject advisors' capacity to lead is dependent on their managerial competence, while Jacobson and Cypress (2012) highlight the importance of qualifications and experience for subject advisors' curriculum leadership. It must be noted that capacity is not always equal to qualifications, although higher qualifications are always recommended. The data in this study seem to suggest that factors other than qualifications are often considered when appointing subject advisors for Mathematics in the Free State province of South Africa. For example, in District B, subject advisor Charles' appointment seems to have been based on seniority, as evidenced by his response when asked about how he became the subject advisor in the district: He stated, *before I became a subject advisor, I was on post level 1, and then became an acting HOD for a year. When the HOD post was advertised, then I applied and was not appointed. I then applied for a subject advisor's post based on my experience as a Mathematics educator for sixteen years. Knowing to teach Mathematics in Afrikaans was also another advantage for me during the interviews. Two weeks after the interviews, I was appointed as a subject advisor.*

From the above quote, Charles's appointment seems to have been based on seniority or on a good record of accomplishment of learner achievement results in Mathematics, as he had no previous management experience. This manner of appointment is consistent with acknowledgement of the appointed educator's will or capacity to lead. When probed further about what he thought informed his appointment as a subject advisor, he responded: *I was appointed based on my experience and seniority. I have a good history of making learners pass with flying colours in Mathematics for the seven previous years. I have a strong passion for Mathematics, I teach learners during school holidays and weekends. By appointing*

*me as a subject advisor, I felt my hard work was recognised. I can teach Mathematics both in English and Afrikaans.*

Charles' response demonstrates an appointment that takes the individual's willingness to lead into account. In contrast, the appointment process of subject advisors is not always transparent but instead, could be characterised by favouritism and shrouded in secrecy, as reported by subject advisor Veronica. *Although I am the appointed subject advisor of Mathematics, Accounting and Economics were my major subjects. When I came to this district, there was [a] need for a Mathematics subject advisor and I volunteered. When the post was advertised, I applied, and I was appointed permanently. I never majored in Mathematics at tertiary even though my competitors had mathematics as a major subject. To be honest with you Mr Sithole I was favoured by the interview panel.* For example, this type of appointment leaves the subject advisor ignorant of subject content and pedagogical content knowledge and this approach is likely to negatively influence the subject advisor's confidence and ability in relation to the job.

Some kinds of leadership appointment have the potential of creating divisions and tensions in the district, which is not advantageous for a role that requires teamwork and fellowship. There is some evidence of the negative impact of such an appointment procedure. Andrew's perceptions of providing extra help and support to progressed learners indicate this. *Unions make my work difficult. You know Mr Sithole, those unions that spread the gospel to educators that educators must not do any additional work after school or during weekends without additional remuneration.* When further, prompted, Andrew explained the challenges that he faces with progressed learners: *My work is also made difficult by age cohort learners who failed the previous grades but were condoned to the next grade due to their age. I have actually run out of strategies of assisting these learners. Most of them are frustrated because they never passed Mathematics from Grades 8, 9, 10, 11 and we are seated with these learners in Grade 12 being expected to make them pass Mathematics for the first time. In most cases, age cohort learners don't cooperate. If I had another option for a job in the private sector, I would resign from my current post. I don't have the magic for progressed learners.*

According to the above account, the way in which subject advisors were appointed compromises their role especially if they are ill-equipped to provide curriculum leadership in various settings, with learners of differing cognitive abilities. This is contrary to the curriculum leadership perspective, where subject advisors are expected to lead in areas matching their strengths and where they align with the school vision, as advocated by Anderson and Bennett (2003). By basing subject advisors' appointment on their own arbitrary judgement and decisions, the district and the unions (SADTU, NAPTOSA) may not be aware of the associations, divisions and tensions they might be creating among the departmental staff. The factors the district and unions take into account and the manner in which they rationalise the implications of their appointment procedures on effective teaching, learning and curriculum leadership within those districts, is unclear. It is interesting to note how sharply appointment criteria contrast with the recommendations of Miller *et al.* (2010), Jacobson and Cypress (2012), who all advocate for capacity and subject advisors' managerial competency as standard criteria for appointments. Furthermore, there is no policy in the South African education system that supports consideration of volunteering, without taking into account the individuals' qualifications and subject content knowledge when appointing subject advisors. Curriculum leadership scholars (Quinn, 2002, Hallinger and Heck, 2011; Sampson and Austin, 2011) also emphasise the curriculum leaders' competencies in organisation, leadership and management of the subject matter, yet in the above cases, this was not considered.

Although unions and the district, from an equal-rights perspective, have the right to define the type of curriculum leaders they need in their districts, it is important that they do so in the interest of improving learner achievement in Mathematics, instead of appointing subject advisors without taking into account the appointees' level of competency. While exercising their rights, unions and human resources may need to consider that subject advisors are critical curriculum leaders who significantly influence development and maintain effective Mathematics achievement in the relevant districts. There seems to be a danger that unions and district officials promote and defend the type of curriculum leadership they need while ignoring the core business of the district's basic functionality, namely improving teaching and learning of Mathematics, as asserted by Hallinger (2012).

In Districts A, C and D, the study revealed how subject advisors' appointment was based on professional qualifications and teaching experience. In District C, Paul perceived that his appointment was based on qualifications and good learner achievement results as well as the ability to assist other educators. When asked about how he became a subject advisor, his response was as follows: *I was an HOD for two years and I was studying Honours, then the post for a subject advisor was advertised, I applied, I went for the interviews and I was appointed. I was appointed based on my qualifications and my learners' matric results that were always excellent. For the two years that I was an HOD, the school had 100% pass rate with the highest number of distinctions in the district in Mathematics. I was then requested to assist other underperforming schools in the district. I managed to improve the overall pass percentage of the fifteen secondary schools that underperformed in the previous year. It was upon this background that I was appointed as a subject advisor.*

The way in which Paul was appointed is in line with Robinson's (2007) claim that when appointing subject advisors, only those educators who have illustrated outstanding performance, not only learner achievement results but who have also demonstrated leadership competencies, should be given the opportunity to lead Mathematics teaching and learning in districts. In Districts B and E, the subject advisors' appointments were based on their experience. In School B, subject advisor Charles captured his view by saying, *before I become a subject advisor, I was just a PL1 and then I became an acting HOD, then the post was advertised and I was appointed. I have sixteen years' experience and my results were of a high quality. I outclassed them in the interviews because I was talking quality results as opposed to strategies.*

In District C, Thokozani, who has a B.Ed. degree, seems to have been appointed for his experience and qualifications. Another subject advisor, Natasha, who also demonstrates this, responded as follows: *The post was advertised, I applied, I went for the interviews and I was appointed based on my qualifications, quality results and experience. Before becoming a subject advisor, I was just a PL2.* When probed about her experience, Natasha responded further by stating, *my experience is that Mathematics is a challenging subject for learners, and learners who need help most, are often absent from school and they also don't attend extra classes. However, I*

*have designed a workbook with low order questions that will allow slow learners to pass with at least 35% if they can master all the problems in that workbook. When asked whether the workbook is for all grades, she responded: Currently I am focusing on Grade 12. Thereafter, possibly next year, I will design another workbook with low order questions for both Grades 10 and 11. My aim is to bridge the gap in all grades, that is, Grades 8 to 12.*

The above responses suggest that the educators' work experience and qualifications are important to their appointment as subject advisors. However, as revealed in this study, there seems to be no consistency regarding consideration of qualifications or experience by the unions and district officials when appointing subject advisors. The issue of qualifications, as established in this study, varied from subject advisor to subject advisor.

#### **4.5.2.1.2 Category 2: CAPS and Mathematics for All**

In most of the cases being studied, the leadership and management of teaching and learning in South African schools is adversely affected by a weak understanding of the new CAPS and Mathematics for All campaign. For example, subject advisor Marry summarised her views about Mathematics for All as follows, *I honestly don't think it's achievable. It is not realistic, not every learner can do Mathematics because learners have different cognitive abilities. Mathematics for All can only be realised provided there is introduction of differential assessment catering for learners' different cognitive abilities.* When prompted further, she stated, *I mean learners have different cognitive abilities and not all learners can do Mathematics. I believe that learners with lower cognitive abilities and age cohort learners should take mathematical literacy instead of pure Mathematics.*

Helen, an educator also supported the above views pointing out that, *Mathematics for All presents serious problems and challenges. Mathematics can't be for all. Trying to force every learner to do Mathematics is rather too ambitious in my views.* When prompted further, Helen pointed out that: *Mathematics can't be for all, it is only for the elite. I am busy influencing other educators in my school and in my Professional Learning Communities not to support the Mathematics for All initiative. Otherwise, we will continue to have extra classes that are fruitless. How do you assist a learner in Grade 12 who cannot do the basics of algebra? I mean, I have*

learners in Grade 12 who cannot solve a simple quadratic equation. The situation is worsened when doing differential calculus, sequences and series and trigonometric equations because the basics of a quadratic equation are applied. Jerome an educator, echoed this viewpoint stating, *Mathematics will never be for all. Learners have different cognitive abilities. Not every learner will become an engineer, scientist or doctor. We need shelf packers in shops as well. I mean... not every learner can do Mathematics and not every learner will use Mathematics in their work situations. Gardeners and petrol attendants at filling stations are also needed by the society.*

Regarding the Mathematics for All campaign, subject advisors seem to be in the informational stage of the concern-based model. In all seven cases being studied, subject advisors were aware of the Mathematics for All campaign but were concerned about its effects on them, the learners and the educators. As for CAPS, subject advisors were in the implementation stage, where they were working as a team with educators and learners. In this stage, subject advisors' interests lie in the effects of the transformed curriculum on educators, learner learning and a search for alternative ways of improving its impacts. During this phase, subject advisors mainly focus on evaluating learners, class performance and development of effective cognitive abilities or skills among learners. Some subject advisors even go as far as saying there is nothing new: it is something that they have been doing all along. Andrew's response is evidence of this: *I don't see any difference between NCS [National Curriculum Statement] and CAPS when it comes to teaching and learning. I encourage my teachers in this district to apply the same leadership and teaching strategies but in CAPS, assessment is given first priority. Educators need to assess learners most and the type of leadership I use in such instances is "hands on", I am part of what they are doing. I also support novice educators with teaching challenging topics and maintaining learner discipline in class. Marry had a similar view, stating ... still the same. Except that CAPS is concerned with mainly pushing educators to finish their curriculum coverage. In CAPS, the focus is mainly a teach and assess strategy.*

#### **4.5.2.1.3 Category 3: District strengths**

Subject advisors raised various factors with regard to district strengths such as committed and experienced educators. In most cases, they referred to dedicated or

experienced educators as district strengths. However, if this is not matched by commitment and a desire (willingness) to innovate, experience alone is not enough. Furthermore, in most cases experience and a desire to innovate seems to be lacking. In District A, the situation seemed to be more positive, because educators are committed and experienced. Mary's response is evidence of this as she stated: *the willingness and commitment of educators in my district makes it easy for me to work with my educators. They are always willing to work for longer hours after school, even during weekends.* When probed further about the impact of unions, she responded: *The impact of unions in my district is very minimal, I can say approximately 90% of my educators continue to have extra classes without additional remuneration as mandated by their unions.*

The subject advisors mentioned extra classes and referred to the advantages of extra classes in assisting learners to progress and catch up with previous lessons. This is revealed in Thokozani response. He pointed out that: *every activity should be initiated by the subject advisor. I am a role model. An extra class starts with me for Grade 12 during weekends. I am on a mission of teaching five schools that have newly appointed educators. The only time I have is during weekends.* When asked as to the impact of role modelling, his response was: *Remember that I am also a member of SADTU. I demonstrate to my educators that learners' needs are priority number one in my district. It is good because it becomes easy for teachers to listen to what you say, if you start acting on it first. If you lead by being exemplary, most educators have a huge probability of following you.* Natasha had the same sentiments and stated: *Most of my educators in my district are self-motivated, and they conduct extra classes without being remunerated extra.* Charles also supported the above, pointing out that: *Educators were reluctant at first. However due to the support of the school principal and his love for the Mathematics for All campaign to be successful, educators had to buy in. Currently, educators are well motivated and are actively participating in the teaching and learning of Mathematics and many times educators are in schools teaching even after school working hours. This is also evidenced by the willingness of educators to execute extra classes during Saturdays and Sundays as well as working for longer hours during the week.*

In addition, participants highlighted the importance of good teaching and learning support materials. Subject advisors in Districts B, D and E referred to the

Mathematics laboratory, computer laboratory, 'Hey Maths!' and other equipment, which could benefit quality Mathematics teaching and learning. When asked about district priorities for Mathematics curriculum leadership, Paul responded as follows: *The District prioritises Mathematics. Every maths learner was given a calculator by the district in January. The district gave nine school maths laboratories where 'Hey Maths!' and other activities of maths are conducted.*

Marry also indicated this. When asked about the impact of the district on the teaching and learning of Mathematics in her district, she responded: *The district supports the Mathematics for All campaign by creating conditions that promote the effective teaching and learning of Mathematics, for instance 'Hey Maths!' laboratories were built in seven schools in my district. All Grade 10 learners are encouraged to take Mathematics by the district. However, challenges still remain in schools due to the fact that school principals in most schools are enrolling many learners for mathematical literacy and fewer learners for pure Mathematics. Gadgets such as tablets are also given to learners doing Mathematics and Science from Grades 10 to 12. This is an incentive for more learners to take Mathematics and Science.*

However, the effectiveness of the teaching and learning support materials that were utilised to support learner achievement in Mathematics cannot be ascertained, since there were no attendance registers indicating who used which resource material and on which dates in schools with Mathematics laboratories. In addition, it is not known whether learners used the gadgets, 'Hey Maths!' programmes, maths laboratory and computer laboratory as a resource centre for collecting information for doing their projects, assignments and homework or as a centre for watching movies and videos not connected to the teaching and learning of Mathematics. Furthermore, subject advisors mentioned external interventions as district strengths such as those implemented by non-governmental organisations (NGOs) such as Marematlou training institute and the private sector also donating laptops and tablets for Mathematics teaching and learning in schools.

In School H, external support from the subject advisor was identified as outstanding and valuable for improving learner achievement in Mathematics. When asked what influence subject advisors have on Mathematics in her school, Helen responded as

follows: *The subject advisor motivates me. She actually demonstrates the teaching of challenging topics at school level with educators. She assists with the provision of resources; for example, textbooks and question papers from other provinces. She has also opened a WhatsApp group that is used as a platform to communicate and share strategies and resources.*

Andrew also echoed the above sentiments. When he was asked about the changes that he has made in the last four years in terms of Mathematics teaching and learning, he responded by stating: *In my district, the enrolment of learners from Grades 8 to 12 has increased. I have organised content workshops to support and develop educators. This was done six times per year. Today the pass rate has increased in both Grade 9 ANA [Annual National Assessments] and Grade 12 results. As you already know Mr Sithole, my district is number one in terms of percentage pass rate and the average is also the best in the province. When prompted further on how he was achieving this, he stated: To make my district work, I maintain close relationships between the internal and external environments to meet learners' needs. Effective teaching and learning is priority number one in my district's objectives and learners are encouraged to participate in lessons. I set targets and standards for learners' achievement and then work as a team with educators to ensure that each learner can achieve more in Mathematics.*

#### **4.5.2.1.4 Category 4: District weaknesses**

Subject advisors in some districts pointed out that educators are demotivated by the demands of the Mathematics for All campaign and by progressed learners. In addition, they pointed out that some educators lack commitment. This is evidenced by high absenteeism and an unwillingness to provide extra classes. When probed about what he meant by the educators' low morale, Paul's response was: *I mean educators are demotivated and demoralised because they have done almost everything to assist progressed learners, but results are not coming. We are supposed and expected to perform miracles with progressed learners. After all, how can they pass if they don't even bother attending school?* Veronica shared the same views. When asked about what challenges she encounters while providing Mathematics curriculum leadership guidance to educators, her response was: *Our*

*challenges include educator absenteeism due to sickness and urgent private matters, as well as learner discipline.*

Thokozani had another concern. When asked what challenges he encountered when providing Mathematics curriculum leadership to educators, his response was; *As for the challenges, time is a problem. Most of these workshops are done after school hours and during weekends and educators have commitments after school. Some educators are very loyal to their unions such as SADTU. They don't work after normal working hours without additional remuneration.* Moreover, subject advisors mentioned excessive workloads and administrative duties as challenges to their curriculum leadership role. When asked about her day-to-day timetable, Veronica responded as follows: *Very busy, too full. My timetable is just like that one of a PL1. If you look at my timetable, it is the same as a PL1 educator. I have insufficient time to execute my duties as a subject advisor. I have to set papers, projects and assignments for Grade 8 to 12. I also have to attend workshops and meetings. Every day I take work home and I don't even finish it at home. I am also responsible for Technical Mathematics besides Mathematics. To be very honest Mr Sithole, I am overstretched.* Andrew also pointed out the above, stating that: *It is not enough because I manage post level one educators, HoDs, set question papers and do administrations work as well. I am also required to attend all districts, provincial and national workshops and meetings.*

From the above responses, it became evident that, subject advisors had limited time to execute their curriculum leadership duties. This finding aligns with that of Budhal (2000:45), who established that, “there was a widespread agreement among the interviewed subject advisors that their work load was getting unmanageable and that many subject advisors lacked the time as well as understanding of their curriculum leadership roles”.

#### **4.5.2.1.5 Category 5: Initial training of subject advisors**

When the participants were asked about the kind of initial training that they had received to perform their curriculum leadership roles, Paul's response was: *Nothing. I was just given an office and I was told by the Chief Education Specialist (CES) that every month I have to submit a monthly report to the CES. No one taught me how to prepare a monthly report.* When probed further on what his monthly report involved,

he stated: *Sir, it was only then that I learnt how to prepare a monthly report. As a district, we don't have a standardised way of reporting. Every subject advisor reports according to his or her own way. There is no guideline or reporting template.* Marry summarised her response to her initial training as follows: *To be very honest with you, Sir, I was given no training, no duty sheets given, no orientation. I was just given an office and told that I must submit a report to the CES after every two weeks.*

Thokozani, when asked how his tasks and functions as subject advisor were communicated to him when he started working as a subject advisor, responded as follows: *I was told verbally that I need to monitor and control both educators and learners' workbooks. I wish if the CES or Human Resource (HR) gave me an initial training before resuming my duties as a subject advisor.* Natasha shared the same sentiments by saying: *There was no training provided. I was only given my cubicle and a laptop. Thereafter, I had to consult with other subject advisors in the province on how to compile a report. I was very lucky because I was given a sample of a monthly report from a colleague in another district and I had to adapt it.* When probed further on what a cubicle is, her response was: *It is my office. And I had to see to it that everything moves smoothly.* All the subject advisors in this study pointed out that they received no initial training. While Andrew acknowledged that he did not receive any initial training, he stated also that: *No training. I was given my office and a computer only. I had to start consulting more experienced subject advisors from the province and other provinces to assist me.*

In all the cases explained above, none of the subject advisors received any form of initial training before he/she assumed his/her duties as a curriculum leader. This is a worrying factor, given the challenges that subject advisors experience, as reported in the literature. It is in light of the above that the importance of initial training for subject advisors before they commence with their duties is viewed. This will give subject advisors a clear picture of the opportunities and challenges they can expect and suggest ways of dealing with the challenges they encounter. If incumbents have a clear understanding of the challenges and opportunities they can expect; this knowledge is likely to improve subject advisors' curriculum leadership, which, in turn, positively influences learner achievement in Mathematics.

#### **4.5.2.1.6 Summary of sub-theme 1**

The findings reveal that in some districts, when appointing subject advisors, the unions, district and head offices consider only the time an educator has served the Department, without considering the educator's Mathematics subject content knowledge. In other schools, qualifications and experience were considered. Despite the differences in the factors considered, a BSc. degree and PGCE qualification seemed to be basic and a common criterion in the appointment of subject advisors. For example, four of the subject advisors in this study (Marry, Paul, Charles and Andrew) had BSc. degrees as well as PGCEs while two of the subject advisors (Veronica and Thokozani) had BEd. degrees and while one (Natasha) has a BAcc in Accounting and Economics and a PGCE.

It was rather strange to note that in some cases, the subject advisors were unaware of the criteria that were used to appoint them in their positions as curriculum leaders. Appointing subject advisors using this approach is consistent with Blase and Blase's (2000) description of a bureaucratic top-down approach where followers are powerless and have no or limited control over decisions that affect their fate or destiny. There is a considerable likelihood that subject advisors will be disempowered by a failure to provide explanations for considerations that guided their appointments as curriculum leaders. Subject advisors' curriculum leadership is not well served by simply having curriculum leaders in the district but it is more important to have curriculum leaders who can effectively promote effective Mathematics teaching and learning, which in turn, influences learner achievement, as confirmed by Timperley (2005). Under the present circumstances, it is possible that an incompetent educator is appointed based on recommendations by the unions and district, to the detriment of better qualified and more competent educators.

Buregeya (2011) suggest that subject advisors' curriculum leadership is sometimes hindered by the continuous call for higher standards of performance in subjects such as science, technology and Mathematics. This shift focuses away from subject advisors' curriculum leadership and may result in curriculum leaders who may not safeguard the Mathematics curriculum competently. There is a possibility that some subject advisors, who were appointed based on the recommendations of unions, district or head office, may find themselves promoting the agendas, intentions and

values of the unions, district and head office, instead of fulfilling their Mathematics curriculum leadership role.

None of the subject advisors in this study received any form of initial training before they assumed their duties as a subject advisor. They pointed out the following as weaknesses: educators who are demotivated by the demands of the Mathematics for All campaign, progressed learners, a lack of commitment by some educators, educators' high absenteeism levels and educators' unwillingness to provide extra classes. Furthermore, excessive workloads, administrative duties and a lack of time for subject advisors to execute their curriculum leadership duties were identified as district weaknesses. As for the district strengths, some subject advisors mentioned committed, dedicated and experienced educators. Others mentioned the advantages of extra classes as well as good teaching and learning support materials and support from the school principals, private sector and non-governmental organisations.

From the discussion of sub-theme 1, it became clear that subject advisors, as curriculum leaders, are important in the implementation of policy reforms. If subject advisors do not see the meaning and sense of certain curriculum reform policies, then the implementation stage will face huge resistance from subject advisors, who will in turn influence other educators. For policy implementation to be a success then subject advisors need to be fully convinced so that they buy in to the idea. Subject advisors also need to have ownership of policy reforms if the implementation needs to be a success and to consult with educators during the drafting stage of curriculum reform policies in order for educators to participate actively in the implementation phase.

#### **4.5.2.2 Sub-Theme 2: Managing the Curriculum and Leading Initiatives**

A significant number of subject advisors expressed satisfaction with their dual roles as leaders and managers of the curriculum. They highlighted being responsible for their actions, being exemplary, being knowledgeable about their schools, as resource allocators, good communicators and good leaders offering educators' mentorship programmes. Two categories emerged from this theme and are discussed below.

#### **4.5.2.2.1 Category 1: Creating conditions needed for effective teaching and learning**

When subject advisors were asked about the conditions that they considered necessary for effective teaching and learning of Mathematics, they gave a variety of responses, though some patterns emerged. When asked what she views as her role in helping educators to change their teaching practices, Natasha pointed out that: *Mainly creating conditions needed for effective teaching and learning of Mathematics. I provide guidance and support to educators in the form of content workshops, classroom management and interpretation of CAPS to educators, these are meant to empower and capacitate educators. I also provide motivational talks to both learners and educators. I demonstrate to educators how to teach challenging content as well as curriculum differentiation.* This was also supported by Jessica who, when asked about her views of the subject advisors' role in helping educators to change their teaching practices, pointed out that: *The outstanding support from the subject advisor in terms of content training workshops, providing resources, motivating both educators and learners is the reason why the schools' Grades 8 and 9 Mathematics results at the end of the year are very good. For the past three years the school has been achieving above 75% pass rate in Mathematics for both Grades 8 and 9. I believe that Annual National Assessment (ANA) tasks are of a good standard and I expose my Grade 9 learners to them.*

In this study, it was found that the role of the subject advisor in creating positive learning environments is focused mainly on giving guidance and support to teaching and learning rather than on management, as maintained by Watkins (2005). It seems that participants perceived interactions among or between educators, learners and context as vital for effective teaching and learning of Mathematics. In one of the subject advisors' content training workshop for educators that the researcher attended, the presenter pointed out that: *We are going to start with a pre-test, now please you are requested to switch off your cell phones and this is an individual activity. After the training tomorrow, you will write a post-test. We expect you to do the same things and approach when you go to your respective schools. Those of you without calculators please come and get them but make sure you will return them afterwards.* I observed that subject advisors, worked to maintain an environment conducive for effective teaching and learning, and they were committed to

requisitioning, utilising and maintaining learning and teaching support materials (LTSM), in most of the schools involved in this study.

During the discussions, the conditions necessary for a positive learning environment were identified and are discussed below.

#### **4.5.2.2.2 Category 2: Participation of educators and learner assessment**

Subject advisors' curriculum leadership in this study was characterised by sharing of district goals as well as giving guidance and direction and supporting educators. This was revealed by Paul who when asked how he supports educators in his district responded: *The high demand for Mathematics as well as science skills motivates and inspires me to obtain, distribute as well as maintain the stock and resources available. Furthermore, I make sure that educators have all the resources and skills that they need to improve teaching and learning of Mathematics. I make efforts to outsource resources from other provinces.* This was also supported by Helen who when asked how she is supported by her subject advisor pointed out that: *My subject advisor is hands on when it comes to both learner and educator motivation. My subject advisor always organises excursions for learners where they see application of Mathematics in real life situations. Moreover, he has organised and conducted content training workshops for educators as well as motivational sessions for learners. Every year my subject advisor always encourages us as educators to enrol learners for Mathematics competitions and Olympiads.* Subject advisors were viewed as committed to teaching and learning and most of the participants in this study were curriculum leaders with focus, who continuously support and guide teamwork. During document analysis, a school safety policy obtained from School E detailed preventive measures to ensure physical safety and prevent accidents.

These learning environments allowed learners to feel safe, being respected as well as being valued so that effective teaching and learning takes place, as advocated by Burden (2006:3). In the analysis of subject advisors' reports and the schools' learning teaching support materials (LTSM) policies, it was noted that educators at School B and School F were actively engaged in the Learning Teaching Support Materials committee and as stated by Mavis, a participant representing School B: *My subject advisor makes it a point that educators in his district have all the resources and skills that they need to improve teaching and learning of Mathematics.* During

lessons, it was observed that subject advisors demonstrated how to teach challenging topics and concepts. This was evidence that subject advisors encouraged educators to think and educators were engaged in a dialogue characterised by enquiry, as advised by Watkins (2005). For instance, Andrew stated that: *In order for my schools to perform and give good results, I maintain close relationships with the internal and external environment to meet both educators and learners' needs. A learner achievement result is priority number one in all my schools. It is compulsory for all educators in my district to attend educator professional development workshops. I set targets and benchmarks for educators to improve learners' achievement results and then work as a team to ensure that learner achievement in Mathematics improves.* Natasha also shared the same sentiments of a collaborative district culture and stated that: *The willingness and commitment of educators makes it easy for me to work with them. They are always willing to work for longer hours after school and during weekends. The execution and implementation of my plans and ideas is made relatively easy.*

However, some participants reported encountering difficulties in creating a positive learning environment, due to poor subject content knowledge. As reported by Thokozani: *Poor educator results in both the pre-test and post-test of this training clearly indicate that some educators experience problems in communicating information and knowledge to learners. Some educators who scored below 70% really struggle with content knowledge. Some did not even bother to attempt the post-test.* In addition, several problems have been identified which contribute to poor achievement (Ruding, 2000; Janney, 2010). In this regard, the educator at School G, Mavis is in contrast to Thokozani (subject advisor) and claimed that: *Learners are not motivated, the morale of educators is low, learner absenteeism, late coming, learners who bunk periods as well as lack of visits in schools by subject advisors contributed to poor learner achievement results in Mathematics.*

Hoy and Hoy (2003) state that it is the responsibility of subject advisors to assist educators in creating conditions supporting the encouragement of learners as well as stimulating good classroom practices that promote learner achievement results in Mathematics. In contrast, the participant at School F, Fionah stated: *Some of us as educators don't meet targets and fail to meet submission dates. I believe that no production will ... I mean effective teaching and learning cannot take place without*

*the cooperation of all educators supporting subject advisors. Consequently, when learners fail, they blame subject advisors. Poor learner achievement was partly a result of barriers experienced by learners during teaching and learning, as pointed out by the participant representing School B: Learning barriers prevent learners to demonstrate learning on their own through tests and other forms of assessments. I am referring to learners in secondary schools who cannot read and write. They can't understand the demands of a question as well as the interpretation of the question. My school uses English as the medium of learning and teaching and these progressed learners are instructed in English. To most of them, English is a fourth or fifth language and we expect them to achieve better results in Mathematics? How possible is this?*

Charles viewed teamwork as a crucial element of educator interactions, stating that it is pivotal for subject advisors' curriculum leadership. This viewpoint was corroborated by Paul, who pointed out that: *I encourage my schools to have subject meetings weekly in order to address the challenges of educators. This will inform the kind of support needed as well as development, to improve educator classroom skills and practices. After every subject meeting, the minutes are emailed to me and will make informed decisions.* These subject meetings provide educators with a picture of active engagement, togetherness, and belongingness and keep subject advisors in contact with colleagues and learner achievement, while they report on learner progress. Some participants pointed out that their work involves major administrative tasks coupled with an unmanageable number of periods of teaching. An educator from School D complained: *My timetable is like that one of a Life Orientation educator. If you look at my timetable [educator showed me his timetable], clearly, you can see Mr Sithole that I have insufficient time to execute all my duties. I am also a member of other committees such as entertainment, matric farewell, disciplinary and sports committee.*

Even though most subject advisors offered a similar opinion, they accepted that it was important to help educators by developing and supporting them. Marry has experienced senior markers in her district and hence, she introduced a mentor and mentee system that involves more experienced educators taking the lead in assisting new educators. She stated: *I support schools by organising question papers from other provinces; share them with educators, networking with educators through*

*WhatsApp, emails and telephones, organizing content workshops for educators, team teaching and promoting educators to join other professional bodies such as Association of Mathematics Educators in South Africa (AMESA). Veronica seemed to work in the same way. She explained that: In consultation with educators in my district, we draw up lesson plans as a team, ensuring that adequate resources are available and I try to be visible and assist educators if they experience problems of content delivery and in getting learners involved in the lessons.*

The above points out that the interactions between or among the learner, educator, subject advisor, subject and contexts are crucial for effective teaching and learning of Mathematics in order to improve learner achievement results. If educators are consulted, they feel at home, have a sense of belongingness and will be motivated to work harder so that policy implementation becomes a success. It is important for subject advisors as curriculum leaders to update every school about policy initiatives, departmental plans and targets so that there is collective ownership of ideas and implementation becomes a success thereof.

Regarding learner assessment, it was noted that subject advisors encouraged educators to give learners quality daily work, homework, informal tests, formal tests and examinations. Veronica when asked what are the best strategies for leading Mathematics teaching and learning stated that: *The best strategies for leading Mathematics teaching and learning are empowering educators through content workshops, net working with performing schools (twinning) team work, motivating educators and learners, organizing Mathematics Olympiads and quiz. I am of the opinion that educator support and professional development opportunities created by subject advisors are the backbone of improving learner achievement results in Mathematics.* The educator at School E also concurred with Veronica (subject advisor), who stated that: *My subject advisor assists us in the district to develop assessments and specify the standards of mastery for the assessment and assessment provide us with valuable information on learner achievement in meeting on the agreed targeted standards of the district.* From the interviews and discussions, it is clear that subject advisors need to conduct training, supply resources and support the educators to overcome challenges encountered in developing common district goals, writing common assessments (national and provincial examinations) and analysing learner achievement.

#### **4.5.2.2.3 Summary of sub-theme 2**

It became evident from the above discussion that subject advisors as leaders of the curriculum are pivotal and crucial in creating conditions necessary for effective teaching and learning of Mathematics, which, in turn, influences learner achievement in Mathematics. In creating such learning conditions and environments, subject advisors set quality benchmarks and standards for the teaching and learning of Mathematics, as highlighted by the Personnel Administration document (South Africa, 1998). Doolittle, Sudeck and Rattigan (2009) are right describing subject advisors as learning leaders. Subject advisors have enormous influence regarding the implementation of curriculum reform policies with the success of policy implementation depending on subject advisors' attitudes, beliefs and practice.

#### **4.5.2.3 Sub-theme 3: Roles of Subject Advisors**

The following categories emerged from the data, when subject advisors were asked about their curriculum leadership roles:

##### **4.5.2.3.1 Category 1: Evaluation of educators**

Roles of subject advisors include evaluating and appraising educators. Most subject advisors executed their roles of leading, assessing and controlling as pointed out by Natasha: *"I take lead when it comes to quality control. I mentor and guide my educators in my district"*. Participants in this study were concerned about their engagement and commitment to monitor and evaluate educators' work. As claimed by Bennett *et al.* (2003:458), monitoring and classroom observation of educators was viewed by subject advisors as showing a lack of trust in educators. This view was supported by Marry, who stated: *One of my roles is mentoring educators; however, I view classroom observation as judgmental on the educator as opposed to educators' professional development*. As advocated by Dean (2002:26-27), most subject advisors admitted appraisal of educators needs to be executed by subject experts, seniors and superiors with adequate subject content knowledge and with the best teaching strategies and practices. As noted by the participant at School E, this posed a challenge: *My subject advisor did not major in Mathematics and he has never taught Mathematics in his life. He is not familiar with the process of IQMS in Mathematics. He only gets involved in mentoring me when IQMS forms are needed by the district. After completing and submitting my educator Professional Growth*

*Plans [PGPs], my subject advisor never discusses the PGP with me; it simply stays on paper.*

Integrated Quality Management Systems does not relate to subject advisors' curriculum leadership role, according to the views of most subject advisors that were interviewed. This means that the question about the role played by subject advisors in mentoring of educators anchored with being accountable remains unanswered (Jita & Mokhele, 2014), although IQMS addresses the competence educators should demonstrate. IQMS covers legal issues related to educator mentoring; however, as claimed by Zepeda (2007:9), the real implementation and roles of subject advisors as leaders of the curriculum are questionable. Thokozani stated: *IQMS does not guide me in ways of dealing with crucial issues ... for example, how to deal with educators' absence and late coming. Although areas of educator competences are stipulated in the IQMS, ways of implementation remain unclear.*

While these expectations were acknowledged as among their roles by some of the subject advisors interviewed as part of this study, the overall conclusions by the researcher were unacceptable as compared to the expected district standards.

#### **4.5.2.3.2 Category 2: Mentoring of educators**

As outlined by Dean (2002), subject advisors support and develop educators who experience challenges with curriculum, challenges related to content, interpretation of policy and teaching and learning. This is illustrated by Andrew who pointed out that: *Besides this, I also conduct educator content training workshops covering content challenges, classroom management, learner discipline as well as strategies for assisting progressed learners.* This view was also supported by a participant from School D, who stated: *The outstanding support from the subject advisor is the reason why the schools' Grades 8 and 9 Mathematics results at the end of the year are very good. For the past four years, the school has been achieving above 90% pass rate in Mathematics for both Grades 8 and 9.* The participant from School A had a different view: *My subject advisor is passionate about educator evaluation. However, I would really appreciate if my subject advisor can stop removing me in class and start teaching my learners on my behalf. I would be happier if my subject advisor can give me time to present lessons and thereafter give me constructive feedback in the absence of my HoD (Head of Department).*

Regarding mentoring of educators, a few subject advisors had implemented mentoring systems that were effective where others failed to meet policy requirements. Mentoring, if practised effectively, promotes effective teaching and learning of Mathematics. However, it seems that arrangements and planning of educators' appraisal were not connected to the schools' improvement plan, on areas such as educator professional development, training and educator support, as suggested by Dean (2002:2) and Hoerr (2005). Paul and Charles had not formalised educator mentoring and as a result, this only took place when the forms were requested by the district offices. This is best described by the response from Marry, who stated: *I only fill in forms where I identify educators' developmental needs for the sake of formality, however in reality, this stays on paper. After educators' developmental needs forms and the submission of the forms was completed, few educators actually change their teaching practices, as confirmed by the participant at School B, who complained: Mentoring is just for compliance purposes and the outputs rarely justify the amount of time, effort and resources involved in the entire process.*

Subject advisors expressed the view that their ideas were not considered; hence, they had bad perceptions on the significance of educator mentoring as a mere wastage of time, as advocated by Gravett (2001). It is in the same vein that (Prestine and Nelson, 2005 as well as Mercer, Barker and Bird (2010) see the unlikelihood of educators being honest about their weaknesses, if the information involved in mentoring is used in determining educators' promotions.

Subject advisors need to find out the needs of educators and concentrate on fulfilling these needs in order to create conditions and a learning culture where every educator is valued and feel at home. Subject advisors should trust educators and allow educators to find out their teaching and learning needs, as maintained by Gravett (2001).

#### **4.5.2.3.3 Category 3: Monitoring and controlling educator and learner workbooks**

Most participants had a negative attitude regarding monitoring, controlling and the process of evaluation. This is best described by Charles, who complained: *It is difficult for me to ensure fairness, I judge educators based on learner achievement*

*results before providing meaningful opportunities for professional development. To be honest Mr Sithole, I only check, moderate and control both educators' and learners' workbooks in schools where learner achievement results are poor. I don't bother moderating and checking performing schools, in performing schools I only check during the moderation of final SBA (School Based Assessment), once in a year during the fourth term. Most subject advisors' opinions were that the educator evaluation process should focus on burning issues like curriculum coverage, curriculum delivery and learner achievement in Mathematics and teaching and learning. Natasha's response was evident, who stated: I perform an important link between curriculum policy and practice. I have the responsibility of evaluating the implementation of these Mathematics policies so that gaps between curriculum policy and practice can be closed. Paul shared the same feeling, indicating: The process of monitoring, controlling and evaluating is fair, because it is based on evidence that was discussed with educators. In this way I support educators in developing their skills and knowledge.*

Documents used by the subject advisors in ten secondary schools under study were analysed. Six schools had book control as a monitoring tool per grade, an assessment monitoring tool detailing the expected number of homework activities, projects, class work, assignments, informal tests versus the actual number of tasks administered by the educators per month. Control measures were there on basis of the quantity and quality of learners' work, marking of learners' workbooks, educators' planning and there was also evidence that learners were given remedial work as well as expanded opportunities for improvements. However, little emphasis was placed on curriculum delivery. For instance, section two of subject advisors' monitoring tool, knowledge of curriculum and learning programmes, has columns of the knowledge of the learning area, skills, goal setting and learner involvement in learning programmes. The columns were divided into two: yes or no, the subject advisors only ticked the yes column with no explanations. Further information was needed to show the degree and extent of educators' knowledge of the learning area, skills, goal setting and learner involvement in the teaching and learning of Mathematics. Section three of subject advisors' monitoring tool had the following components: lesson planning, preparation, presentation, recording of learners' results and the management of learning programmes. The completed monitoring tool shed some

light on the educators' classroom practices and illustrated where the subject advisors' attention was focussed. The comments by the subject advisors on the monitoring tool suggested low levels of understanding of what subject advisors were looking and checking for as curriculum leaders. A case in point was the comments next to the lesson presentation column, it read *educator is confident* and next to the column of knowledge of the learning area, it was written *educator is knowledgeable*. Further information was needed to accompany the phrase "educator is knowledgeable". It was not known whether the type of knowledge the subject advisors referred to was content knowledge, curriculum knowledge or knowledge of working with learners, or whether this knowledge was imparted well to learners. The few comments on the assessment section suggested a basic search for compliance. On the column of written work under assessment, the comment was, "*some learners failed to do their homework and daily tasks*". There was nothing written under the remedial and follow up section. Moreover, under assessment on the column of homework, class activities and assignments, the comment was, "*only nine activities were done.*" Nothing was said about the quality of those activities and there was no indication of the number of homework activities, class activities and assignments which should be administered per week or month, as stipulated in CAPS. As subject advisors only ticked under the yes or no column, the researchers was not able to ascertain what the yes response entails.

The documents analysed revealed that subject advisors conducted classroom observations, monitored and controlled both educators and learners' workbooks. However, the quantity and quality of the administered tasks by educators to learners leaves a lot to be desired. Schools D and H submitted pre-moderation forms, a monitoring instrument, a class visit timetable, an educator file monitoring tool and control list, a control timetable for Grades 8-12 and learners' workbooks. The content of these documents related to whether educators adhered to subject policy guidelines. The subject advisors used these to evaluate whether educators were assessing according to the prescribed assessment standards, as outlined in CAPS. Further information was needed to establish whether educators are complying with CAPS of the National Curriculum Statement.

The monitoring tool for controlling learners' workbooks revealed if homework had been given to learners, if learners' workbooks had been marked and to check if

remedial work was done. The class visit tool checked whether educators had a timetable, the classes were well organised and if there was management of discipline in the classrooms. The class visit tool did not say anything about the quality of teaching observed by subject advisors during class visits. A closer look revealed that subject advisors were not sure of what to look for when they control and monitor, probably they were only checking for compliance.

Of concern is that all the documents for monitoring submitted by Schools A and D were not filled in (blank). The empty forms may imply that at the time of data collection, no book control, class room observation, control of educators and learners' work books had taken place even though subject advisors had monitoring and control tools.

Even though Bennett *et al.* (2007) view monitoring, controlling as well as the process of evaluation as a connected activity aimed at improving teaching and learning, some subject advisors, as revealed in this study, had concerns about the issue. Subject advisors should focus on supporting components of monitoring, controlling as well as evaluation, and not the judgemental ones (Dean, 2002). The process of monitoring, controlling and evaluation should be included in the planning stage of subject advisors' curriculum leadership. Furthermore, subject advisors need support, because they are held accountable in how they support educators as well as mentoring educators. The reasons for subject advisors' poor performance listed by participants are shortage of skills, knowledge of curriculum, giving guidance and support, heavy workloads, lack of motivation and a desire to be fully supported in executing their roles as curriculum leaders. Tension between educators and subject advisors as well as conflict among staff/employees, presented challenges to the subject advisors' commitment to monitoring, controlling, evaluating and supervising educators. Although subject advisors should act as monitors, controllers and evaluators of educators, most subject advisors' time was spent on issues such as discipline, resource allocation and its management thereof.

#### **4.5.2.3.4 Category 4: Observation of educators**

Most subject advisors, as revealed in this study, were of the opinion that they had the capability and knowledge of executing their duties as leaders of the curriculum. This was evidenced by Veronica, who stated: *Truly speaking, there is no need for*

me to observe my educators in their classrooms, most of my educators are highly experienced and highly qualified their learner achievement has been always good for the past 8 years. Educators in my district are highly productive; hence, I respect all my educators. Subject advisors only visited educators' classes when there had been challenges of discipline, poor learner achievement results and learner behaviour. Bennett *et al.* (2007), in contrast, state that educators need opportunities to try new ways and strategies of improving classroom practices and feedback is essential on their performance measured in terms of learner achievement, in order to change their teaching and classroom practices for the better.

One of the most important reasons that subject advisors are compelled to undertake classroom observations of educators is that educator knowledge and practice can be enhanced. As argued by Bush (2013), the perceptions of subject advisors are determined largely by subject advisors' pre-existing cognitive ideas. This is illustrated by a response from Andrew, who reported: *Variations are noticed during moderation of both educators and learners' workbooks. As a district, our educators plan together, mark examinations and tests in their respective clusters together as well as doing team teaching to remedy the problem. Moreover, educators in my district do lesson presentations and reflections together as a team in their respective circuits (municipalities).* In this instance, teamwork can play an important role as well and knowing the manner in which educators play specific roles in a district is vital in promoting subject advisors' effective curriculum leadership.

#### **4.5.2.3.5 Category 5: Subject advisors as visionary leaders**

As revealed in this study, without a clear vision for the future, improved learner achievement in Mathematics is not possible. This is revealed by Andrew, who stated: *I communicate a clear vision to my educators in my district at the beginning of every year. I set targets to all my schools in my district and ensure that these targets are achieved through supporting both educators and learners. I am hands on when it comes to educator and learner support.* For any improvement in learner achievement, vision is the backbone. Tensions, however, may arise if there is no shared vision between the subject advisors and educators. In contrast, Khulekhani complained: *My subject advisor is results-oriented; however, I would be happier if I can be involved in the process of setting targets. Some targets are unrealistic and too ambitious; hence they demoralize both me as an educator and learners.* In this

instance effective teaching and learning is hindered and this has an effect on learner achievement in Mathematics. The subject advisor in this case needs to possess other skills such as the ability to take the lead, motivate, influence and inspire because the subject advisors remain the chief instigator, guardian, and promoter of the district vision as suggested by McLeskey and Waldron (2011). Subject advisors as visionary leaders need to facilitate change effectively. This can be done through subject advisors talking more often and enthusiastically about district vision, promoting new teaching and learning strategies as well as being steadfast when facing challenges as leaders of the curriculum. Subject advisors as visionary leaders need to motivate, inspire, encourage teamwork, mobilise and support educators to work towards district goals that are aimed at improving learner achievement in Mathematics.

#### **4.5.2.3.6 Category 6: Educator professional development**

Professional development refers to formal processes amongst which are conferences, seminars, workshops, team work and attending courses at colleges or universities. They can also take the form of subject meetings, informal discussions among district colleagues, individual studies, researching, and observation of colleagues, peers and subject experts. This is evident in Andrew's words: *I support educators by outsourcing resources from other provinces such as question papers, lessons, and videos. I also conduct educator content training workshops covering content challenges, classroom management, learner discipline as well as strategies for assisting progressed learners.* Natasha shared the same views by stating that: *Competitions and Olympiads are the reason as to why my departmental results were always above 90% even my Grades 8 and 9 were doing well in ANA when I was still a HoD. It was against this background that I was requested by the district to conduct educator training workshops covering content challenges as well as methodological shortfalls in my district. The following year, I was appointed a subject advisor.* Throughout the interviews, participants had the most to say about educator development and support in relation to subject advisors' curriculum leadership roles – this response illustrates commitment of districts in developing educators professionally, ensuring that effective teaching and learning takes place, as suggested by Dean (2002). At the centre of educator professional growth is the subject content knowledge and the ability to utilise different teaching methods and

strategies in order to assist learners in maximising their learning and mastering of content, as claimed by Steyn (2003) and Shakeshaft (1989). I sensed from the data collected from the participants that there is need for continuously engaging educators in professional development, so that educators are equipped with better skills, knowledge, application of knowledge strategies that improve educators' classroom practices, so that learner achievement in Mathematics improves. Improvement of quality education through content workshops and trainings was emphasised from participants' responses. As revealed in this study, educator training and workshops were informed by an analysis of educators' strengths and weaknesses by subject advisors. This is best illustrated by Marry, who stated: *As for the strengths, most of my educators in my district are self-motivated, they teach in the classrooms with or without any supervision. Some educators also have time for extra classes without additional remuneration. The weaknesses are that other educators tire up on the way, due to some learners' attitude towards Mathematics. Some learners perceive Mathematics as a difficult subject especially progressed learner.* Furthermore, few subject advisors as advocated by Lock (2003), had a desire to know educator needs, to improve educators' classroom practices, thereby promoting effective teaching and learning, which, in turn, influences learner achievement in Mathematics

University programmes and colleges fail to adequately and extensively provide the necessary educator learning and teaching experience essential for educators to be effective in their classroom and teaching practices. Once educators obtain their teaching qualifications and are in the field, learning through experience is crucial and this is achieved through continuous professional development. This is evidenced by Thokozani's response, who stated: *I am of the view that, I do not know everything and hence, I continuously attend developmental workshops and trainings in order for me to be capacitated so that I can also empower my educators and learners. I am a lifelong learning subject advisor and I have imparted this lifelong learning spirit to educators in my district.*

Once employed, new educators need enough time and space to gain classroom practice and teaching skills that promote effective teaching and learning. More experienced educators also face challenges due to the introduction of curriculum reform policies such as CAPS, and changes which call for attention to a variety of

teaching methodologies, technological improvements and advancements as well as learning needs of learners. Poor learner achievement in Mathematics is mainly due to inadequate training of educators and in most cases, the training does not address teacher needs and learner needs. This is illustrated by the response of a participant in School J, who complained: *Most of these educator training workshops are time wasting. They don't really address the challenges of progressed learners in my school. I used to attend these workshops always; however, my attendance has declined in the past two years. More than 60% of my learners are progressed learners and these workshops only cater for nearly 40% of my learners, hence I always get the same results every year.*

The study has revealed that subject advisors struggled to address problems, experienced by educators who often fail to maintain learner discipline, experience content knowledge challenges as well as classroom management challenges. With the support of subject advisors, educators' classroom and teaching practices will improve which ultimately influences learner achievement results in Mathematics positively. Secondly, this study shows that many schools provide mentors and workshop training for novice educators and new educators, who when they have received ongoing training, had management to improve learner achievement in Mathematics, as claimed by Cohen and Crabtree (2008). On-the-job training is important because all educators are actively involved in professional development, since educators' training is included as part of a school day, rather than training being attended by volunteers during holidays and weekends. Educators can also apply skills and practice with on-the-job training. On-the-job training can also be beneficial because educators' learning and training occurs in their setting and hence educators can apply the teaching skills, practices and knowledge gained from workshops in their schools. In this study, educator-training workshops occurred after school hours, during school weekends, on holidays at the level of the school, municipality and district.

Educator professional development is the most crucial factor in promoting effective teaching and learning, which results in improvements in learner achievement. Educators continually expand their knowledge, skills, practices and experiences through professional development with the hope of assisting learners to achieve more in Mathematics. This study has revealed that educator professional

development is a backbone of improving classroom teaching and learner learning practices. In addition, educator professional growth was viewed in this study as one way in which educators gain new skills, new knowledge and classroom practices that leads to an improvement in learner achievement results. Even though developing educators professionally is the core duty of subject advisors, educators remain pivotal during the implementation process of educator professional development. As advocated by Beerens (2000) and Blackmore (1989), educator professional development is critical for learner achievement in Mathematics. Marry indicated that time is allocated for educator training and workshops in her district. Thokozani stated: *Educators need professional development because professional development influences the quality of learners' achievement results in Mathematics positively.* Thus, in order for learner achievement to improve in Mathematics overall, raising the quality of educators' teaching standards through educator professional development was viewed as important by participants. Educator development, as viewed by most participants, was pivotal for improving educators' teaching skills and classroom practices, and to improve educator's professional knowledge and skills with the aim of enabling them to fulfil their core responsibilities of teaching and learning effectively.

### **Types of educator professional development programmes**

Educator development is multidimensional, and most of the participants interviewed conduct programmes at their schools; these programmes involved various activities, such as subject meetings, educator development activities, memo discussions, content workshops, as well as mentoring of educators. The programmes took place in a variety of settings; some were on-the-job training and others were off-the-job training as pointed out by Usher and Edwards (2007). However, the training programmes were perceived as not continuous by the educators. This is best represented by the opinion of the participant at School E, who complained: *Sir, no one is there to follow up or monitor the effectiveness of the implementation of what was discussed during district or provincial training workshops. When I am invited for training, I attend and again the same problem happens.* Educator development depends on school, district and provincial assistance and the commitment of top management level to plan, promote and organise educator professional development initiatives. As claimed by Dean (2002), educator professional development must be

integrated and collaborated in the culture of the school for successful implementation and sustainability of educator professional development initiatives. This is illustrated by Natasha's response, which states that: *I have introduced a spirit of lifelong learning in my district. This issue of content workshops, memo discussions and team teaching are now the culture of my district.*

As revealed in this study, educator professional development is one strategy used by subject advisors to train educators, through workshops, mentoring in the hope of empowering educators to improve their classroom and teaching practices. In order for training workshops to improve teaching and learner learning, which in turn influences learner achievement in Mathematics, training workshops need to focus on both educator and learner needs. Educators need to plan, prepare, set targets and reflect together so that effective teaching and learning takes place.

This study's findings also echo those of Jita and Mokhele (2014) who revealed that planning together on ways of teaching challenging topics in Professional Learning Communities (PLCs) assisted them in improving both on educators' pedagogical content knowledge and learner achievement results. Educators can assist each other in CAPS interpretation as well as discussing methodologies and instructional material to use through planning together in workshops or PLCs. Establishing libraries and district resource centres and improving the frequency of supervision and workshops were other suggestions raised to improve learner achievement results in Mathematics. Other scholars such as Lineburg (2010), Naicker, Chikoko and Mthiyane (2013) have argued for educators to be afforded with more time for professional development. From the deliberations of the observed educator workshops with subject advisors, findings suggested that both subject advisors and educators felt that the frequency of workshops should be at least once per month on issues pertaining to the improvement of Mathematics teaching and learning. Some of the examples from the UK and USA, as cited by Hammond *et al.* (2009) report that educators spent approximately two thirds of their time in workshops. From these experiences, developing countries such as South Africa could also learn; the challenge, however, could be attributed to the fact that in South Africa there are no incentives given to educators for professional development as opposed to educators in developed countries.

## **Outcomes of educator professional development**

Subject advisors and educators work together in a learning team to use error analysis as a way of understanding learners' needs, what learners master, learners' challenges, identifying gaps and determining what learners need to learn and what educators need to teach as well as the manner of teaching the content so as to close the identified gaps. This is revealed by Andrew, who stated: *Being informed by mistakes that are commonly made by learners, I have designed a workbook in my district together with the consultation of my educators. The workbook clearly shows the content to be taught, how and when it is supposed to be taught.* As revealed in this study, subject advisors in their curriculum leadership interacted and associated intensively with chief education specialists, more experienced educators and subject experts from the provincial university, the University of the Free State (UFS).

In addition, it became evident throughout the study that subject advisors incorporated skills into lesson preparations as well as determining educators' awareness of learners' achievement improvements in Mathematics. This was achieved through sharing of experiences, skills, knowledge and application thereof of good practices in teaching and learning, this finding echoes that one of Ng et al (2015). In their meetings, subject advisors focused on the following: what went well, what did not work, what needs to be changed, what needs to be maintained and existing evidence that learner achievement in Mathematics is improving or not. This was followed by areas identified as needing change and improvement given another training workshop date to ensure that educators constantly work to be more effective in addressing learners learning needs and or challenges.

Apart from district and provincial initiated workshops, some of the subject advisors, as revealed in this study, initiated professional development programmes such as studying for an honour's degree or master's degree. They did this to gain new knowledge and skills with the hope of serving educators and learners better or with the intention of getting a better post, like that principal or circuit manager. Subject advisors can improve their curriculum leadership through learning from each other, sharing the best practices and supporting each other. Educators' professional development gives three groups of outcomes, firstly because of educator's active participation, educators gain insight into better teaching and learning practices. Secondly, an improvement in educator teaching practice leads to improvements in

learner achievement results in Mathematics. Although educator professional development is costly, if subject advisors' curriculum leadership improves, learner achievement will also improve.

The teaching and learning process is not effective by chance. Even though some educators are more gifted naturally than others, effective teaching and learning is because of continuous educator professional development such as training, studying, reflecting, practising and working hard. Educators cannot learn enough about the manner in which learners learn and strategies impeding learning as well as the manner educators influence learner achievement in Mathematics. Learners learn more whether they are high performing learners, average or progressed learners if educators regularly attend high quality training. Subject advisors' curriculum leadership, as revealed in this study, improves with studying, reflecting, practising, experiences and working hard. An improvement of subject advisors' curriculum leadership is illustrated by continuous support of both educators and learners. As demonstrated in this study, training gives educators a continuous opportunity for improving their classroom and teaching practice, which in turn influences learner achievement in Mathematics positively. Learners learn more when educators learn continuously.

District-based officials, administrators, subject advisors and HoDs must support and encourage schools to consider educator professional development as an ongoing activity and at the same time, provide sufficient time as well as facilitate educators' training workshops that address both educator and learner needs. District officials and subject advisors who are responsible for organising and facilitating educator training workshops, should have a clear picture of learners' learning needs which results in challenges which educators have difficulty in addressing. Workshop organisers and facilitators should design workshops and training sessions which address identified learner needs and educator needs or challenges, if there are any. The rationale is that when educators' challenges are minimised and learners' learning needs are given first priority, then learners will ultimately achieve more in Mathematics. Subject advisors and educators need to be exposed to continuous professional development, so that they gain knowledge, skills, and strategies that improve their teaching and learning practices.

However, lack of transport and long distances could contribute negatively to the frequency of educator workshops. It was revealed from the interviews that educators seemed to be reluctant to attend workshops due to the location of some schools in remote areas with poor road conditions.

### **Findings from observations**

Through observations which were used in order to complement data obtained from interviews and documents, the researcher was able to capture *in situ* the manner in which subject advisors interacted with educators in meetings and workshops. The observation protocol included, but was not limited to whose voices are being heard, the place and if there are any silences, whether there are any voices being challenged or denied, the artefacts used, if any, the individuals using the artefacts as well as the manner in which the artefacts are being used, amount of time spent on an activity and those appearing to be acting as boundary keepers in terms of topic focus and social interaction. Through observations, the researcher was able to capture some of the voices of participants with regard to the curriculum leadership role of Mathematics subject advisors and the implications for Mathematics teaching and learning. Observations permitted the use of a dual sensory mode, that is, hearing and sight as well as seeking for explanations and clarity thereby allowing a better understanding of the phenomenon under investigation.

The data revealed that subject meetings and workshops were some of the key practices of subject advisors' curriculum leadership. The focus of the study was the manner in which subject meetings and workshops were conducted as well as the impact in shaping educators' classroom practices. It was also important to observe the relevance of instructional practices as well as taking special interest in the topics that subject meetings and workshops deliberated. This study also focused on subject advisors' administrative issues besides their curriculum leadership practices, thereby confirming Giordano's (2008) assertion that most workshops play both pedagogical and administrative roles. Subject advisors were preoccupied with administrative issues whereas educators were concerned with changing their classroom practices with the hope of improving learner achievement results in Mathematics.

## How the workshops proceeded

Curriculum leaders are warned by Chappuis *et al.* (2012) to be punctual and safeguard against collaboration time turning into non-instructional time. Observations indicated that subject meeting and workshop participants were not punctual as nearly half of the participants were not at the venue by eight in the morning (08:00hrs) the starting time, including participants (educators) from the nearest town, five kilometres distant. Some were late by thirty minutes and others by approximately an hour, resulting in the workshop commencing at 09:15hrs.

As participants entered the venue, they were served with breakfast. Participants were seated in such a way that they could see each other, subject advisors and Chief Education Specialists sat in front facing educators. Before the workshops could start, the programme director requested a volunteer to give a scripture reading and open the session with a word of prayer. This was followed by welcoming all the participants and everyone present by the provincial Chief Education Specialist, who welcomed and introduced the visitor/participant observer. The CES expressed her concern over time consciousness and punctuality. She concluded her welcome by to all subject advisors and educators to strive towards excellence when it comes to issues of learner achievement results in Mathematics. *Ladies and gentlemen, I would really want to congratulate Motheo district subject advisors and educators for giving us the top thirty-five best Mathematics learners in the province, all with 100%.* Several curriculum leadership scholars (Hallinger & Lee, 2012) referred to such a statement as setting overarching goals or defining the mission of an organisation. This was followed by announcements, thanking schools and individuals who made contributions towards participants' refreshments (breakfast and lunch) as well as housekeeping rules.

After the announcements, the CES introduced the director of curriculum, who also gave the purpose for the workshop and deliberated on sharing best teaching practices. He stated that participants should not fear writing pre-tests and post-tests because *the purpose of these tests is not to compete against each other but rather to compete with the teaching and learning as well as evaluating the system.* One subject advisor introduced the CES and educators were requested to stand up as they were introducing themselves individually. After writing the pre-test, educators

were requested to submit their scripts to the subject advisors who marked the scripts and gave feedback which grouped educators' achievement results in categories of 100%, only 8 educators, 90%-99%, 23 educators, 80%-89%, 16 educators, 70%-79%, 21 educators, 60%-69%, 32 educators, 50%-59%, 54 educators and 46 educators achieved below 50% totalling 200 educators.

Thereafter, educators were grouped according to their performances and these groups were led by subject advisors. The pre-test consisted of previous matric past examination papers covering trigonometry, Euclidian geometry, proportions and similarity, financial Mathematics and functions. In these groups led by subject advisors, discussions on content challenges as well as strategies to approach the questions were held. It was surprising to note that educators were not given their scripts back after marking; however, they had to write a post-test after the group discussions. The group discussions during the breakaway sessions were lively and educative because they included educators, subject advisors and chief makers. The chief maker was given the opportunity to present how marking is done at the marking centres. Educators were promised that the results of the post-tests would be sent to their respective emails. The workshop ended at 16:30hrs.

To sum up, it was evident from observations that workshops had managed to align their action plans to the curriculum reform policies such as Mathematics for All and CAPS. Aligning workshops action plans implies that workshops complied with district and provincial curriculum reformation mandates in attempting to improve learner achievement results in Mathematics. Marzano & Waters (2006) views such an activity in terms of guided autonomy and May *et al.* (2012) concur with activities' importance in ensuring that schools and districts operate within the regulatory framework that guides the curriculum leadership role of subject advisors. In the same vein, workshops that operate within guided autonomy have the advantage of doing whatever is deemed essential (necessary) in improving learner achievement results in Mathematics without losing sight of district and provincial expectations as well as targets. The activity of aligning action plans with district and provincial benchmarks and targets also echoes the findings of Hallinger (2012) as well as Nkambule and Amsterdam (2018).

The majority of the participants felt that educator workshops should focus more on tests, CAPS interpretation as well as motivating and equipping educators with the

relevant knowledge and skills to ensure improved learner achievement results. The recurrence of these activities implies their importance in improving educator classroom practices, which in turn influences learner achievement results directly. Advocates of curriculum leadership also concur that workshops are mostly designed to improve educators' pedagogy and educator professional development is one of the core activities (Aiping, 2007; Jita & Mokhele, 2012; Jones, 2009; Spillane, 2004). Hallinger and Lee (2012) affirm that educator professional development can incorporate incentives as in the form of awarding and recognising outstanding achievement at both the level of the school and district. Effective educator professional development is demonstrated in educators' classroom practices, skills and competencies being sharpened by workshops. Educators are kept in tandem with the demands of the teaching profession through professional development. The interpretation of CAPS was identified as lacking for most educators and suggested that educators should receive training in those respective areas of CAPS.

#### **4.5.2.3.7 Summary of sub-theme 3**

Considering the participants' responses under this theme, it is clear that subject advisors, as curriculum leaders, are responsible for influencing teaching and learning of learners through educators. Subject advisors are responsible for exposing all educators to mentoring, and to monitor, control and evaluate educators, in order to improve Mathematics teaching and learning, which in turn influences learner achievement in Mathematics. It is of paramount importance that "subject advisors, who are appointed in their positions on the basis of their knowledge, develop educator mentoring systems and strategies for educators in their districts" (Bush, 2003:59).

Subject advisors' responsibilities comprised allocation of resources, their management thereof, extracurricular activities, core curriculum activities and learner discipline. Most of the subject advisors interviewed were clear about their curriculum leadership roles, but less clear concerning their competing levels of authority. This finding aligned with that of Lieberman and Mace (2010) who established that subject advisors lack an understanding of their curriculum leadership role. There was little evidence of accountability in schools, as indicated by high absenteeism by educators, poor learner discipline and non-existent educator professional

development programmes. Subject advisors' administrative duties did not provide them with sufficient "time for paying" enough attention to their primary roles as leaders of the curriculum, as echoed by Henning *et al.* (2004:115), even though they should, as curriculum leaders, continuously promote, support and give guidance and direction to teamwork in their districts.

The theme discussed above illustrates the most significant reasons why educators need professional development, how professional development should be done, when it should be done, who should be involved and the shortcomings of educator professional development. As revealed by Henning *et al.* (2004) and Harris (2004), professional development needs to be done with the belief that educators' classroom skills, practices and knowledge is directly related to learner achievement in Mathematics. Stimulating, nurturing, and supporting educators' professional development remains one of the critical duties of subject advisors, since it is directly related to educator competency as echoed by the findings of Stephenson (2010), which in turn influences learner achievement in Mathematics. Subject advisors are vital role players as curriculum leaders since they know the strengths and weaknesses of their educators and this knowledge together with what they do with it influences learner achievement in Mathematics. As leaders of the curriculum, subject advisors are better positioned to identify departmental, educator and learner needs due to contact and association with educators and learners (Cohen and Crabtree, 2008). Subject advisors are responsible for the management of learner achievement results, implementation of curriculum reform policies as well as creation of conditions needed for effective teaching and learning. Subject advisors, together with their educators, are responsible for setting district goals, targets and benchmarks as well as planning on ways of achieving the targeted goals and objectives. Effective teaching and learning of Mathematics cannot occur without subject advisors adopting a dynamic leadership approach coupled with good communication skills and team work so that all educators participate in the implementation stage, as they then have a sense of ownership of the targeted goals and objectives.

#### **4.5.2.4 Sub-theme 4: Challenges and Opportunities facing Subject Advisors' Curriculum Leadership**

The following challenges and opportunities emerged from the data and are discussed in the subsequent sections.

##### **4.5.2.4.1 Category 1: Challenges facing Mathematics for All**

It was clear from the collected data that the Mathematics for All approach has experienced challenges because of learners' different cognitive abilities. The main challenge was that subject advisors had mixed feelings about Mathematics for All, if they bought into the idea then Mathematics for All would become a reality and prove effective. This is evidenced by the response of Veronica, who pointed out that, *I believe that Mathematics for All can be realised if both learners and educators are given the necessary support based on the needs of educators and learners. If educators are patient with slow learners, then Mathematics for All will be realised.* However, if they were against the idea, then they could influence other educators not to support Mathematics for All. The participant at School E, had a different view: *No. maths can't be for all. It is only for the elite. I am busy influencing educators not to go for the maths for all campaign (educator was emotional).* Andrew pointed out that if the Mathematics for All campaign was to become a reality, policymakers would have to abolish Mathematical Literacy and force all learners to take Mathematics from earlier grades. Natasha expressed the same opinion by stating: *Educators need to focus on basics from earlier grades like algebra and policymakers need to introduce Mathematics at higher grade, standard grade and lower grade so as to accommodate learners' different cognitive abilities. What about progressed learners? We need to accommodate them as well.* Thokozani had a different view and pointed out that: *Most of my schools can never realise this. Approximately seventy-five percent of my schools are currently struggling with progressed learners, learner achievement is not improving, and they seem to have lost hope. Those learners who can do maths let them do it and those who can't do Mathematics, let them do mathematical literacy (subject advisor was emotional).*

##### **4.5.2.4.2 Category 2: Challenges posed by progressed learners**

As revealed in this study, subject advisors and educators were challenged in working with progressed learners, as evidenced by a response from Natasha, who pointed

out that she needs training on *management and support of progressed learners*. Also, *curriculum leadership remains a problem to me for instance, what can be done to ensure that subject advisors assist educators to empower progressed learners? I need to know the best practices that subject advisors can use to maximise teaching and learning of progressed learners*. Mr Sithole, *the strategies for dealing with progressed learners remains a challenge in my district*. Remember that from 2020 onwards progressed learners are no longer allowed to modularise (writing some subjects in November and the remaining subjects in June the following year). This finding is further supported by the Minister of Basic Education, Mrs Angie Motshekga, who pointed out that “the 2015 national matric pass rate fell to 70,7% compared to 75,8% in 2014” (DBE, 2017:23). Another factor that contributed to the fall in the pass rate were the 65 100 progressed learners, who were promoted to Grade 12 after failing Grade 11 twice. Out of that number, only 22 000 passed. The policy of progressing learners was implemented in 2013. The reasoning behind it was that Grade 11 learners who have failed twice would drop out of the system as a result, a decision was made to give them a chance of writing the National Senior Certificate (NSC) (Motshekga, 2016). Member of Executive Committee (MECs) had pressure from schools about this decision as without the progressed learners, the national pass rate would have been 74% (Motshekga, 2016).

The progressed learners were given extra support for the NSC or allowed to modularise their examinations, meaning that they could write part of their examinations in November 2015 and the rest in June 2016. An analysis of the raw data on progressed learners paints an extremely interesting picture. For the class of 2015, there were 65 671 progressed learners, which was 9,8% of the total number of full-time candidates registered for the NSC examinations. Out of the 22 060 progressed learners who wrote their examinations, 37,6% passed their examinations, while 3,97% went on to receive bachelor passes and qualify to be admitted to university. The progressed learners also managed to scoop over a thousand distinctions. Some 8 473 progressed learners obtained diploma passes and 10 264 obtained higher certificates passes (Motshekga, 2016).

Mrs Angie Motshekga, the Minister of Basic Education, when addressing educators in Newcastle at the opening of the National Teachers' Union (NATU) at the Teacher Development Institute in 2016, pointed out that progressing learners to the next

grade through condoned passes was not working. There are significant challenges associated with progressing learners, such as content gap challenges, high failure rate, lack of human and financial resources; however, holding learners back also discourages learners leading to many learners dropping out. Educators feel demotivated because the achievement results of progressed learners do not match the amount of time and effort given by educators. This is also revealed by the response of Thokozani, who stated: *Since the beginning of this year, most schools in my district nurture progressed learners in order to improve learner achievement results, however, learner achievement results remain low despite the efforts. I mean educators are demotivated and demoralised because they have done almost everything to assist progressed learners, but results are not coming.* The Minister of Basic Education further pointed out that there was need for the Department of Education to review the subject advisor post, which she felt, was being abused. Subject advisors are the immediate supervisors of educators at district level and they should oversee and support educators to promote effective teaching and learning, which in turn influences learner achievement in Mathematics. In this study, there was general consensus in the collected data that subject advisors as curriculum leaders are not adequately trained and utilised effectively (DBE, 2015).

There are a number of problems when it comes to the South African school system. A significant amount of money has been pumped into the schooling system but it has not provided results, as evidenced by learners' poor achievement in Mathematics. The Minister of Basic Education has been quoted as saying that the standard of education is slowly improving, this is presumably based on the matric pass rate hovering above 70% mark over the last few years.

A closer look into the matter reveals that this should not be the cause for celebration since looking at the number of learners who pass matric having entered the schooling system twelve years earlier depicts a darker picture. Only 38% of learners who were in Grade 2 in 2001, passed matric in 2011, (DBE, 2015). The majority of learners drop out between Grades 10 and 12 and they add to the masses of poorly skilled youth that are unemployed. Hence, the 70% pass rate is not after all very compelling. The high dropout rate of learners in the latter years of secondary education is because of poor or very low-quality education in Grades 1 to 11 as

learners are given condoned passes and are progressed to the next grade without having acquired the basic skills or knowledge.

Surprisingly, this low standard of education in secondary schools has been demonstrated in a number of international benchmark literacy and numeracy examinations. Just recently, South Africa was ranked second last in the world when it comes to Mathematics and Science Education according to a World Economic Forum report (DBE, 2015). This is supported by earlier benchmark examinations such as the 2003 Trends in International Mathematics and Science Study (TIMSS), where South African Grade 8 learners were ranked last out of 50 countries in Mathematics and Science. In an effort to address this challenge back in 2011, the Department of Basic Education implemented the Annual National Assessments (ANA), testing learners from Grades 1 to 9 using standardised examinations for each grade. However, the results have shown a dramatic lack of basic numeracy with even lower cognitive questions being answered incorrectly.

The government has equalised education spending per child across all racial groups; however, this increased spending has not translated into positive results. Government expenditure on education is the single largest item in the budget and what is interesting is that low-income countries spend far less on education but perform better than South Africa regarding international benchmark examinations. For instance, South Africa spends almost five times as much per learner compared to Kenya but Kenya's learners perform significantly better on Mathematics according to Southern African Consortium for Monitoring Educational Quality (SACMEQ) report. It is evident that spending more money on education will not increase the standard of education especially considering the fact that the majority of the education budget (78%) goes towards educators' salaries (DBE, 2015). The solution to South Africa's education crisis lies in two parts, firstly improving the standards of lower grades (Grades 8 to 10) and secondly, better equipped educators. This implies that subject advisors' curriculum leadership is critical in order to improve learner achievement results in Mathematics.

The policy of progressing (condoning) learners to the next grade needs to be reviewed as this practice does not benefit the school or the learner. Condoning

learners to the next grade tend to produce poor learners who will struggle to cope with later grades as a result of a poor foundation; hence, the high dropout rates from Grades 10 to 12. It is critical that learners come to grips with the fundamentals of Mathematics from earlier grades. If it means a learner has to repeat a grade, let it be so, this will be beneficial in the end. Secondly, subject advisors' curriculum leadership needs to improve, since subject advisors are the engines of districts' subject performance. With improved subject advisors' curriculum leadership, educators teaching practices will improve and this will lead to an improvement in learner achievement in Mathematics. It is recommended that subject advisors are retrained and that there is an even allocation of suitably qualified and experienced subject advisors to district. At present, it has been reported that the distribution of highly skilled subject advisors is skewed towards Model C school (previously white schools) (DBE, 2015) and this skewed distribution of subject advisors needs to be corrected if an equal education for all learners is to be achieved, which in turn influences learner achievement in Mathematics.

#### **4.5.2.4.3 Category 3: Challenges perceived with educator professional growth**

Professional development workshop organisers and service providers do not plan and work together in finding strategies and skills for improving educators' teaching and learning classroom practices. Those organising the professional development training workshops do not seem to have a clear picture of educator needs and challenges as well as learner needs that should result in the desired targeted outcomes. In addition, educators often complain that they are required to participate in professional development workshops that do not address the real challenges educators face in their schools and classrooms. Educators resent 'one-size-fits-all' training workshops, targeting educators, coming from different schools and varied backgrounds with diverse learner needs.

Apart from this, training workshops fail to cover differing levels of educators' knowledge, skills, motivation, interest and learners' backgrounds. Consequently, training workshops are perceived as a waste of time by educators as they fail to cover a wider scope of educators' training and development needs that can be applied in teaching and learning practices to address learner needs. On the other hand, there are no complaints if professional development workshops organisers and service providers consider the varied needs of educators and learners and

training and ensure that development is relevant and can be applied in educators' school settings.

Educators' participation in professional development workshops increases if educators see meaning and purpose attached to the training. In addition, participation increases if educators realise that learners' achievement in Mathematics will improve after the training at workshops. This is consistent with what Shadraconis (2013) refer to as the value of the training. The impact of educator training programmes was not satisfactory in spite of the subject advisors' efforts and commitment to educator professional development. Singh and Nkambule and Amsterdam (2018) concur, and state that educator training is at times limited to transfer of knowledge and skills shaped by workshop providers. This is best represented by the response of a participant at School D, who stated: *Educator professional development initiatives don't relate to the work that we are doing. Most of the workshops are not practical. I mean ... you can't apply that knowledge to enhance better quality of the process of teaching and learning of Mathematics.*

The participant at School H expressed the same sentiments and complained: *I fear to be regarded as incompetent. Educator training and development is tedious and supposed to be meant for children rather than adults.* These programmes were not characterised by good communication, nor were they understood by educators, as stated by Paul: *My efforts to train and develop educators is not recognised by the schools and hence, I find it difficult to encourage educators to attend these developmental programmes. The school principal is always complaining that they don't have money for transport and most educator development initiatives are scheduled for after school hours or during weekends.* Even though educator training and supporting workshops are dependent on educators' commitment, most educators interviewed portrayed a concern with educator training, that does not address educator and learner learning needs to ensure quality teaching and learning of Mathematics. "Much of what is learned should be specific to the situation in which it is learned", as claimed by (Bennett, Dunne & Carre, 2000:17).

It was noted by the researcher that if training and workshops were in place, those initiatives were disconnected to curriculum objectives, even though it was aimed at promoting professional growth of educators. It seems that in some cases, educators have an ulterior motive in attending professional development workshops. Marry,

stated clearly: *Educators only attend professional development workshops to get the certificates of participation which is needed for them to acquire SACE credits. And, after all, if they apply for promotion, these certificates will benefit them.*

As suggested by Craft (2000), one can deduce from the data collected that subject advisors have no interest in educator developmental programmes where they cannot see meaning and value in the training. When it came to modelling there was a consensus in the collected data that subject advisors mentored educators and demonstrated teaching through lesson presentations as good practices that promote effective teaching and learning of Mathematics. Natasha stated: *I have a mentee and a mentor system in my district. I build good relationships with educators and really lead by being exemplary and I encourage expertise and developmental needs of educators to be given first priority*". Thokozani echoed this view by stating that: *"Senior and master educators are appointed to mentor new educators and as a subject advisor, I give critical support to underperforming schools.* It seemed that most subject advisors had certain practices and skills and they illustrated them to educators in the classrooms.

While Craft's (2000) view that the educator professional developmental process needs to be continuous and should develop new skills and knowledge should be accepted, it is not an easy process to support. The reason for this difficulty, as the analysis illustrates, is that subject advisors lack the time to carry out educator professional development activities. Educator professional training and workshops are not integrated into the schools' overall plans. Charles stated: *My schedule is filled by the many demands of teaching and administrative functions. In fact, the only time available to develop educators is during weekends or holidays. It is impossible to get them there, more especially those who really need support because they are loyal to their unions.* Considering that educator professional development training and workshops were presented after school hours and during weekends, these initiatives were restricted due to time. It made demands upon subject advisors, demands that were considered to be unreasonable and strenuous, as reported by Veronica: *Looking at my job responsibilities, it is clear that I am not given the time and opportunity to do my duties. I also have to fulfil my roles with limited power and authority.*

It was evident that subject advisors had a full workload. Most subject advisors made use of training and workshops conducted by the province and district officials rather than putting educators' professional training in formal and informal settings. According to Phelps (2012: 8), "educator-training workshops need to be created to improve educators' skills and knowledge in their classroom practices which ultimately leads to improved learner achievement" such as improved results in Mathematics. Learning communities must be created to enhance skills and knowledge of educators in the district. In this study, taking into account the conditions subject advisors work under, the evidence of a conducive learning environment was lacking. Subject advisors acknowledge the significance of educator professional training and workshops as crucial for improving learner achievement in Mathematics; however, the training and workshops were not related to learner needs. This is revealed by a response from a participant at School C, who stated: *Trainings and workshops are not linked to learner needs. The skills and knowledge gained from workshops cannot be applied in our school settings.* In contrast Andrew stated: *When facilitating educator professional development programmes, I need to plan actively and incorporate methods and strategies that encourage educators to link the content of the programme to the actual teaching practices and their working environment.*

The above views are in line with Mackeracher (2004:27), who claims that "adults live in contexts in which they must apply what they have learned to practical and real-life situations". Thokozani stated: *As a facilitator of educators, I should create a learning environment more familiar and structured to the real school environment and engage educators in social interactions.* There is need for subject advisors to plan, design and promote training and workshops that address both educator and learner needs, as suggested by Dean (2002), and deal with new concepts, skills and resources. This idea is elaborated by Doolittle et al (2009) who suggest that educators, as lifelong learners, need to be engaged fully in the construction of new knowledge and skills which leads to learner improvement in Mathematics as opposed to when the training and workshops are imposed upon them by subject advisors. If educator professional development training does not address educator and learner needs, educators do not see the need in attending. Subject advisors face a challenge of creating conditions and environments where educators raise their concerns freely

about topics and areas in which they need training, support and development. As revealed in this study, most of the training and workshops provided failed to provide feedback. There was no follow up and the workshops could not be applied to the educators' school settings.

Subject advisors identified transport as a hindrance to their curriculum leadership. This is stated clearly by Natasha: *I have got challenges with transport; my district is too vast and, in the district, we only have five cars. Everyone is expected to fulfil their duties using these vehicles. I am just a subject advisor, CESs, HR, deputy directors, procurement section and financial departments are given first priority to use the government vehicles.* Andrew was rather emotional, he stated: *I have used a government vehicle only twice for the past three years. Mr Sithole it's very difficult nowadays. I am expected to visit all my 46 secondary schools and give feedback on a monthly basis. When you look at this properly, I have to visit at least two schools every day given the fact that I have twenty-two working days. I also have to attend district meetings and provincial workshops. The truth is, it is only the top officials who have got a luxury of using government vehicles.*

When probed he responded: *I have resorted to using my private car. However, there are still some challenges; I must not drive more than 2000 kilometres per month because they will not pay for my extra claim. Per day I travel at least 400 kilometres, this means that in one week I have already exhausted my limit of monthly 2000 kilometres. What about the remaining three weeks? How will I visit other schools? Per month, I need to travel at least 8000 kilometres to serve and support all my schools.* Marry had a different view, she stated: *Transport is a threat to my curriculum leadership. Even though I am getting a transport allowance, I am not allowed to travel more than 2000 kilometres per month. The 2000 kilometres is not only for visiting schools but also for attending district and provincial workshops.*

When asked further, she responded: *I am using a WhatsApp as a platform to share resources and strategies with my educators. In my district, we have resorted to travel in one car when visiting schools. This means that all subject advisors of different subject that can fit into a car will travel together to one school and support educator and learners. The next time when visiting another school, we use another colleague's car. We keep on rotating.* Paul reported on the issue of distance, he stated: *Schools in my district are too remote and the roads are very bad. My car*

*needs to be serviced after every 10000 kilometres instead of being serviced after 15000 kilometres. I cannot mention government vehicle because I know I will never get it. After visiting these remote schools, I always have challenges with tyres of my car bursting. When asked further he stated: It is for these reasons I have created a WhatsApp group with all the educators in my district so that communication of strategies, resources and good practices is enhanced and promoted. Similarly, I have also requested all my educators to create a WhatsApp group with their learners so that effective teaching and learning continues even outside the classroom.*

It is clear from the above that subject advisors had transport problems or in some cases it is the human resource and other resources, which may need funding. Subject advisors could not fully implement curriculum leadership in all schools due to isolation, remoteness of schools and standards of roads. However, subject advisors created WhatsApp groups with their educators to mitigate the challenges of transport. This finding concurs with that of Moswela (2010) who established that the subject advisors in Botswana were not able to carry out their role of curriculum leadership because the schools were too remote and isolated.

#### **4.5.2.4.4 Category 4: Challenges with discipline**

It was evident from the response of participants that subject advisors had problems with both educator as well as learner discipline. This was specifically pointed out by Natasha, who stated that: *I view IQMS as something that does not guide me in ways of dealing with crucial issues such as educator's absenteeism, bunking of classes and other issues as well. Although areas of educator competencies are stipulated in the IQMS, it does not shed light into the manner of how it is supposed to be implemented.* When subject advisors were asked whether they have educators who possess challenges of competency, the responses were varied but some emerging themes were common. The challenges ranged from educator discipline, content challenges, classroom management and interpretation of the memo. This is best illustrated by Andrew who reported that: *Yes, Nine educators. They are not consistent with marking. They do not mark according to the memo. They are still new in the department straight from the CUT (Central University of Technology). They also have content challenges. Their challenges of marking were identified during moderation of learners and educators' workbooks. They are open to tell me that they*

*have content challenges in probability, Euclidean geometry, financial Mathematics and trigonometry.*

During two classroom observations of a subject advisor demonstrating the teaching of challenging content issues at School B and School F, educators had problems in dealing with learners behaving badly. A lot of time was wasted in addressing learners' bad behaviour. The participants expressed their frustration, as pointed out by School E's participant: *I have a challenge of responding appropriately and effectively to learners' bad behaviour. As you can see, Ms Veronica, I am afraid to discipline these rude learners [participant expressing anger], who disturb teaching and learning, and they waste a lot of time.* This opinion was supported by Paul, who experienced the same problems and complained that: *Some educators in my district cannot control their classes during teaching time. I need to organise a classroom management workshop for them.* And in the same vein, the participant at School J pointed out that: *I am afraid of reprimanding these learners who are rude [participant pointing to the learners], because I am going to have problems with their rude parents, who refuse to accompany their learners to school for disciplinary hearings when their children fail to abide with classroom rules. I am afraid to punish these learners to be honest Mr Andrew.* When a report on disciplinary hearings that had been held by a subject advisor at School I was analysed, the cases "included educator bunking classes, educators' absenteeism, swearing at educators, smoking of illegal substances, sexual harassment, fighting as well as gangsterism", as reported by Hoy and Hoy (2003).

#### **4.5.2.4.5 Category 5: Opportunities for subject advisors' curriculum leadership**

Subject advisors, as revealed in this study, had opportunities of working with dedicated and committed educators with the desire to work even during weekends. This is captured in Natasha's response: *I have highly committed and dedicated educators in my district who understand that we have transport challenges in the district. Most of my workshops are conducted during weekends because I do not want to remove educators from class during teaching time.* When probed, she stated: *Most educators in my district are members of (South African Democratic Teachers Union) SADTU; they always attend my workshops because they see the value and importance of these trainings even though SADTU is saying no meetings*

during weekends or after school hours. Thokozani had a different view, he stated: *I find it difficult to conduct educator training workshops outside the school environment because my educators are always busy teaching learners. Even after school and during weekends my educators use this time to close the gap and assist those learners who are less gifted in Mathematics. If I want to develop them, I would rather visit their schools and work collectively with them to assist learners.* When asked about the influence of unions, his response was: *Unions are fully aware that educators in my district are highly motivated and committed. Learners' work is priority number one for most of my educators. Mr Sithole (subject advisor looks into my face), my educators would prefer not attending union meetings than leaving learners unattended (subject advisor was emotional).*

Marry stated that: *I have created a WhatsApp group with all Mathematics educators in my district. This was because of transport challenges in the district. In the WhatsApp group we share best practices, resources and latest strategies on improving Mathematics teaching and learning.* When probed, she responded: *I don't buy data bundles for my educators. My educators are always on WhatsApp and hence communication of crucial and urgent information is promoted. My educators buy their own data.* Paul had another view, he stated: *At the beginning of every year, I have got start up workshops. In this kind of workshop, it is a platform where schools that have done well in grade 12 November results are given an opportunity to share their strategies with other colleagues.* When interrogated further his response was: *Those educators with outstanding pass rate and averages are given certificates of appreciation. In a way these certificates are valued by educators because when they apply for promotional posts, they attach them. Besides this, educators fear to be labelled incompetent and hence a healthy competition amongst educators is created.*

Consequently, promoting the conditions required for educators to learn to transform curriculum improvement is crucial. Literature does not tell us much about the fact that educators are involved in curriculum execution without questioning practices (Prestine & Nelson, 2005). A case in point is subject advisors scheduling time for educator reflection, fostering educators working together and analysing learner performance results (Neumerski, 2012). These possible opportunities could assist educators in curriculum implementation and the structures may provide conditions for educators to learn ways of improving curriculum delivery, in essence, improving

learner achievement in Mathematics. However, the structures do not do the learning for the educators. In spite of reflecting, participating in teamwork and possessing enough information, some educators may not have the desire or know how to learn with the aim of improving the quality of curriculum execution in the classroom. Ramatseba's (2013) study revealed that a mentoring approach by subject advisors as well as its effects on improving quality teaching and learning of Mathematics should be given special attention. In addition, the study also suggests the importance of on-going educator professional development as pivotal in improving learner achievement results in Mathematics. Dlamini's (2013) study revealed that subject advisors made many sacrifices such as working after school hours and even during weekends in order to improve learner achievement results in Mathematics. Jaka's (2013) study found out that communication is one of the important strategies that promotes and contributes to improved learner achievement results in Mathematics. Our understanding of what is happening under these conditions and opportunities for learning and teaching, inside and outside classrooms, is lacking. How do subject advisors interact with one another, with other educators and with specific contexts, to promote learning in learners? What is the process through which subject advisors transform the curriculum? Neumerski (2012) points out that if we intend to shed light on our understanding of how subject advisors improve the curriculum, we need to redirect our attention to curriculum leadership research, focusing on the practices of subject advisors in pursuit of curriculum leadership.

#### **4.5.2.4.6 Summary Theme 4**

It emerged from this theme that subject advisors had challenges with the Mathematics for All, progressed learners, educator professional development, learner discipline, transport challenges and their opportunities include but are not limited to committed, dedicated and willing educators. It also became evidently clear that subject advisors had challenges of working with progressed learners. The subject advisors in this study struggled to get working strategies for dealing with progressed learners.

### **4.5.3 Theme 3: Constructing a Theoretically Sound Account to Explain the Understandings and Implementation Practices of Mathematics Subject Advisors in South Africa**

Participants gave several suggestions with regard to how the curriculum leadership role of Mathematics subject advisors can be understood and explained. These are divided into two sub-themes and discussed below.

#### **4.5.3.1 Sub-theme 1: District Logistics**

The following categories emerged and are discussed below.

##### **4.5.3.1.1 Category 1: Internal logistics of the districts**

Unanimously, it was agreed that the curriculum leadership role of Mathematics subject advisors could be more effective if subject advisors work closely with subject heads; but there is a need for someone such as the district resource educator to coordinate district activities in municipalities. Three educators were concerned about the lack of a district coordinator to coordinate educator professional development training in order to learn and share best practices from other educators in performing schools. This is captured in Albert's words, who complained: *Our district is too vast and we only have one subject advisor, it is clear from my experience in this district that we need a resource coordinator, who is based in municipalities and can assist educators whenever we have got challenges with Mathematics teaching and learning.* Helen echoed the same sentiment by stating that: *WhatsApp is not the solution to our challenges that we encounter in class. The availability of a district resource coordinator in my district will add value to the quality of Mathematics teaching and learning.* When prompted further, she argued: *I mean subject advisors are not always available when we need them. After all, it depends on the availability of data bundles which is also another burden to us as educators. What if the subject advisor is booked off sick for three or six months like in my situation? What happens and where should I go for help?* This finding is consistent with Klar's (2012) study which revealed that district resource coordinators have the potential to assist in improving the quality of Mathematics teaching and learner learning.

The appointment of district resource coordinators was also suggested by Malinga (2016), but at the time of this study none of five districts in the Free State had employed one, suggesting a lack of system support and will on the part of the district

offices. Furthermore, it was suggested that there was need for districts to construct resource centres with library books, internet, live broadcast lessons and typographical facilities to ensure that district records would be safely housed and accessed. James stated that: *There is need for my district to have resource centres where we can get resources whenever we need them. Although the subject advisor sends documents on WhatsApp, some files are too large for one to download and consumes a lot of data. Why can't the subject advisors send the documents to resource centres readily printed, so that we can simply go and fetch them according to our learner numbers. Mr Sithole, you really know that schools do not have money for photocopying and buying toner (ink). Why schools and educators should be burdened with buying data and making copies with the limited resources that schools have? As an educator I don't get data allowance from the Department of Basic Education.*

#### **4.5.3.1.2 Category 2: Structure of the districts**

Participants suggested that more workshops on methodology as well as pedagogic content knowledge be offered whilst acknowledging the utility of educator professional development workshops. The major concern was on the frequency with which members should meet. Participants were of the opinion that increasing the frequency of meetings would allow more activities such as lesson observation, class supervision and modelling. Participants also felt that districts/municipalities should have common work schedules or syllabi aligned to CAPS, ensuring that the set tests would be valid and reliable. This is consistent with Hammond and Richardson's (2009) assertion that learner achievement in Mathematics improves when educators interpret the curriculum and plan together.

The findings pointed out to steps, which can be taken to improve the curriculum leadership role of Mathematics subject advisors, if they are to be agents for better Mathematics teaching and learning. Participants pointed out that there are better opportunities for subject advisors to improve the efficacy and quality of teaching and learning only if the government seriously considers the restructuring of districts/municipalities. Dedicated educator leaders to this end should be appointed to coordinate district activities at both the cluster and district level. In this vein, Jita and Ndlalane (2009) argue that it is not merely the existence structure that is the district, but it is the associations among educators, which matter most. The

government should move away from rhetoric to praxis when coming to inter-school collaboration educator professional development as suggested by (Stein and Spillane, 2005). Findings reveal that there is a lot of will and capacity amongst educators and the community which district officials should complement through policy frameworks that are supportive. These policy frameworks will ensure that district activities resonate around the core areas of Mathematics teaching and learning.

#### **4.5.3.1.3 Category 3: School conditions**

The study established three effects caused by school conditions. In the first place, department composition in selected schools was not subject based. This finding is in contrast to Highfield's (2010) study which revealed that in other countries, researchers report on subject departments for instance, Mathematics, Science, or English while in South Africa that is not the case. The ten secondary schools in this study portrayed a variety of arrangements as well as grouping of subjects to form a department. The subject advisors' curriculum leadership role became increasingly challenging because of this arrangement. The finding on the effect of subject department culture is consistent with the studies that reveal that the subjects have their own distinctiveness, philosophies, contexts as well as pedagogical implications, as highlighted by Highfield (2010) and Hallinger and Heck (2011). As argued by Steyn (2003), it is clear from subject advisors' responses that districts need to develop abilities, conditions and environments that develops and promotes subject advisors giving guidance and direction to the curriculum.

#### **4.5.3.2 Sub-theme 2: Means of curriculum leadership influence**

The subject advisors used different ways to influence the teaching and learning of Mathematics (instructional practices).

##### **4.5.3.2.1 Category 1: Educator professional development**

The subject advisors initiated educator professional activities. This is evidenced by Paul by stating: *I initiate educator professional development activities in my district. I don't wait for the province to organise workshops for educators in my district. We are addicted to workshops in my district because educators are always leaving my district for Gauteng; hence I need to train new educators entering the system.* Andrew had a different view, he stated: *I always create a balance between*

*educators' professional development and protecting educators' instructional time.* When probed his response was: *I mean I need to balance between workshops and keeping educators in the classrooms. To me, as long as learners are passing well, I do not want to overburden educators with trainings. Workshops should be informed by both educator and learner needs.* From the above responses, subject advisors seem to recognise educators' intellectual resources or attempted to develop as well as explore educators' knowledge and skills. The subject advisors seem to have adopted a surplus model of educator professional development, as suggested by Lai and Cheung (2013) that is, not waiting for educators' cry for help before taking any action. The findings suggest a proactive role instead of a reactive one in support of Mathematics educators and it challenges that one of Tsoetsi and Mahlomaholo (2015). Subject advisors supported educators in attending workshops, subject advisors also attended these workshops and they proactively developed instructional material. In fact, as indicated by Andrew, subject advisors worked with educators collectively to develop the assessment tasks and projects, this finding contrast that one of Guskey (2004), who revealed that subject advisors develop assessment tasks and share these tasks with educators to improve the quality of teaching and learning.

#### **4.5.3.2.2 Category 2: District subject meetings**

In the ten secondary schools, district subject meetings did not present a fertile environment for developing collegiality among educators nor was there any other forum where this could be done. District meetings tended to focus on administrative matters and created tension between educators instead of collegiality. Seemingly, the subject advisors did not have a mitigation strategy to address this threat to collegiality; this finding is contrary to Wanzare (2012), who revealed that subject advisors had strategies of dealing with challenges to collegiality. There was evidence of forums where educators were assisted by subject advisors to plan instructional practices, analysed learners' scores and planned intervention strategies where learner achievement results were poor. Subject advisors also attended district subject meetings, as was the case in Klar's (2012) study and invited external experts to train educators, as in the study by Ng *et al.* (2015).

#### **4.5.3.2.3 Category 3: Feedback and evaluation**

In this study, little or no evidence was found of attempts by subject advisors to implement systems as well as procedures to monitor the effectiveness of Mathematics teaching and learning or to reflect on the quality of instructional leadership practices of subject advisors, as revealed by both Hallinger (2011) and Yamasaki (2016). This is the area that the conceptual framework has identified as absent in previous frameworks. None of the educators from the ten schools conducted an analysis of tests and learner achievement results. Even though the learners' examination and tests scripts were moderated, the findings suggest that the purpose of the moderation was to check the accuracy of marking as opposed to learners' level of understanding concepts in Mathematics. There was no evidence of score or item and error analysis conducted to understand curriculum challenges and to strategise on mitigating the instructional challenges, as suggested by Bennett, Woods, Wise and Newton (2007). From the interview with Thokozani, it was evident that the subject advisor wanted to provide feedback to the educator about the need for lesson demonstration as well as assisting with SBA tasks. The manner in which subject advisors' curriculum leadership role is practised is such that there is no platform for such feedback. There was no entertainment of the possibility of holding one-on-one feedback with educators, possibly because of the negative perceptions held by educators on classroom observations, as revealed by Wanzare (2012) and Bredeson (2000). The outcome of the lack of feedback from both educators and subject advisors was evident in the types and quality of tasks that were set by educators and poor learner achievement results in Mathematics.

#### **4.5.3.2.4 Category 4: Supervision**

The study established that subject advisors engaged in peer supervision through which subject advisors would observe others teach and feedback would be given after the exercise. This practice has the potential for far-reaching impact on learner achievement results in Mathematics. Some of the literature reviewed in Chapter two also suggests that professional advice from colleagues may have long-lasting effects on improving Mathematics teaching and learning, as claimed by Lieberman and Mace (2010). Andrew said: *It is wonderful to get advice from other colleagues. They observe you teaching, scrutinise the way you present and thereafter discuss. I have actually benefited from these exercises.* Supervision from colleagues has a greater

effect than that of formal leaders, who in most cases are viewed as on a fault-finding mission, as established by Hammond *et al.* (2009) and Lineburg (2010).

Findings from the observations also showed that whilst subject advisors were supervising each other, educators also shared strategies on how best they could improve Mathematics teaching and learning. This was also confirmed during the observed meeting when visiting School B. An educator from the nearby school was also present and they shared good practices on developing and setting a quality project for learners. When Mavis the educator from School B was interviewed, she stated: *As part of our supervision, we assist each other as educators. Nothing is left out when other educators visit you.* This view confirms that the objective of professional learning communities is to improve among others, school supervision as well as teaching and learning, as argued by Pomuti and Weber (2012). The success of professional learning communities could be attributed to a spirit of tolerance, in which one accepts failure as well as constructive criticism.

#### **4.5.3.2.5 Summary of sub-theme 3**

It emerged from the sub-theme that in order to develop a theoretically sound account of subject advisors' curriculum leadership, there is need to look into the internal logistics of the districts as well as district structures and prevailing conditions in schools. It also became clear that subject advisors used educator professional development workshops, district subject meetings, evaluation and feedback as well as supervision as a means of curriculum leadership influence.

## **4.6 CONCLUSION**

This qualitative study provided a lens and a means of exploring the curriculum leadership role of Mathematics subject advisors for Mathematics improvement in the classroom, which could not have been possible with quantitative approach. Curriculum leadership or instructional leadership, as it is known in other countries, has become an acknowledged educational reform strategy whose modus operandi and utility are a source of contestation and debate, as claimed by Jita and Mokhele (2013) and Aiping (2007). It was this contestation that propelled the researcher to embark on this study particularly in a country whose economy is in a recession,

unemployment remains high (39%) and ironically strategies to turn the fortune of the nation are long desired through quality teaching and learning of Mathematics.

Data that emerged from an exploration of subject advisors' curriculum leadership role demonstrated the complexity underpinning subject advisors' experiences and the way their leadership role influences the teaching and learning of Mathematics in secondary schools. This study has illustrated that subject advisors require adequate information and knowledge concerning curriculum leadership and management, educator professional development programmes, educator monitoring, control, supervision and evaluation. The subject advisors' curriculum leadership role calls for skills of leadership and at the same time, because subject advisors are leaders of the curriculum, they must continuously improve and sharpen their practices and skills. Subject advisors are faced with the challenge of introducing educator professional development initiatives, but due to a lack of time, huge workload and educators' negative attitudes towards professional growth, they find it difficult to accomplish.

For the subject advisors' curriculum leadership to be effective, the focus should be on learner needs, analysis of learners' results, identification of learners' learning challenges, determining problems educators have in addressing learner learning challenges and investigating what content educators need to know, the manner it should be taught and when it should be taught in order to address learners' learning challenges. Educators need to be organised into teams and each team needs to have an expert facilitator to guide and direct the team to establish and pursue learning district goals as revealed in learner achievement results. District workshops in this study were conducted by subject advisors with a focus on common topics educators had content challenges.

The previous chapter and this chapter together provide the foundation for recommendations relating to subject advisors' curriculum leadership roles with regard to the curriculum, and to promote educator effectiveness in classroom practices with the hope of improving learner achievement in Mathematics. Chapter 5 contains discussion of significant findings and summaries of findings, makes recommendations and conclusions. The chapter also provides suggestions for future research to shed light on our understanding of the interactions involved in subject

advisors' curriculum leadership role and how these interactions influence learner achievement in Mathematics.

## CHAPTER 5

### SUMMARY, CONCLUSION, AND RECOMMENDATIONS

#### 5.1 INTRODUCTION

Data analysis as well as data interpretation on the perceptions, beliefs, understandings and ideas of subject advisors as curriculum leaders and the manner subject advisors' curriculum leadership influences learner achievement results in Mathematics was presented in Chapter four. Subject advisors have the right of enforcing some duties on their subordinates as well as taking action on those educators who do not cooperate to achieve goals, since as leaders of the curriculum, it is the duty of subject advisors to ensure that there is teamwork among educators in a district and creating the conditions and opportunities promoting effective teaching and learning of Mathematics in order to achieve the agreed upon district objectives. This idea comes from the view that there can be no organisation without some degree of supervision of the activities by those subjected to administrative power, as claimed by Giddens (1987), Leithwood and Riehl (2005) as well as McLeskey and Waldron (2011). On this basis, the organisational implications of the findings were also interrogated. Chapter 5 therefore, outlines important findings that emerged from the exploration of subject advisors' curriculum leadership and the implications for the teaching and learning of Mathematics thereof. This is followed by recommendations and suggestions were outlined thereafter for future research on ways of building as well as improving this study's findings.

#### 5.2 SUMMARY OF FINDINGS

This study of the curriculum leadership role of Mathematics subject advisors for Mathematics improvement in South Africa provides insight into the practices of Mathematics subject advisors in different contexts and situations. The major purpose of the study became the overarching question of the study: *What is the policy and or regulatory framework that guides and or regulates the functions of subject advisors in curriculum leadership and support in South Africa?* This question as well as the sub-questions have always been pertinent to the researcher who was once an educator (eleven years), an HoD (six years), principal (four years) and national

president of SAASTE (five years), working directly with subject advisors. Thus, the need to capture the views of both educators and subject advisors was deemed necessary and important. Initially, five subject advisors were thought ideal but casting the net to a wider area of seven subject advisors and ten educators assisted to give a more general and valid picture of the curriculum leadership role of Mathematics subject advisors for Mathematics improvement in South Africa. To this end, seven subject advisors and ten Mathematics educators were interviewed. The qualitative approach in the form of interviews and observation assisted in shedding light and explaining key themes emerging from the study as well as in establishing the manner subject advisors' curriculum leadership role is shaped and practiced in the five districts of the Free State province in South Africa. Following section comprises the presentation of the summary from the empirical study.

### **5.2.1 Summary of Finding 1: Roles and Responsibilities of Subject Advisors**

The individual educational philosophies of the subject advisors played a role in how they carried out the curriculum leadership role. It emerged from the findings that the curriculum leadership role of Mathematics subject advisors' practices can be conceived of as any activity carried out as a result of collaboration between or among schools. The activities are perceived relevant and useful by educators, who were able to make decisions and work out the best way to be productive utilising the available resources. This attests to the York-Barr and Duke (2004) framework that links the associations of six components, namely management and administration, subject advisors' personal attributes, leadership work, school conditions, feedback and evaluation of effectiveness as well as intermediary outcomes of leadership work, with the intention of improving Mathematics subject advisors' curriculum leadership. As educators and subject advisors associate, they determine activities that are ideal to improve the teaching and learning of Mathematics. As argued by Angella and DeHart (2011), contingent variables, such as background of learners, size of the school, organisational culture, labour features and school community type, form the components of the conceptual framework, while subject advisors' experiences and competencies in Mathematics comprise another component.

The *modus operandi* of the curriculum leadership role of subject advisors' practices varied from district to district indicating in most cases their will, ingenuities of subject

advisors' curriculum leadership and capacity. The variations of subject advisors' curriculum leadership practices within districts confirms effective interaction whose meaning should be shared by other persons for the common good of Mathematics teaching and learning, as revealed by Hogg and Vaughan (2011).

Overall, the participants pointed out that their roles and duties were to provide support and guidance to educators, analysis of tests or examinations, lesson supervision, educator appraisal, monitoring, controlling educator and learners' workbooks, mentoring and developing educators professionally which are characterised by many scholars (Hallinger, 2012; Hallinger & Heck, 2010; Spillane, 2005) as key components of curriculum leadership. In addition, subject advisors are tasked with carrying out administrative work including the provision of resources and paperwork like completing monitoring tools. Apart from this, subject advisors also teach, check educators' lesson plans and are expected to manage and lead the teaching and learning of Mathematics and curriculum coverage. The above findings are in line with both Fletcher and Bells' (1999) and Jones's (2009) findings that subject advisors' curriculum leadership roles and responsibilities amongst others includes resource provision, monitoring and controlling, doing administrative work such as paper work. While we can then conclude that subject advisors' curriculum leadership role has the potential of sharpening and improving educators' classroom practices, however the nature of the practices that they engaged in as well as the manner in which these practices are performed, seem to be varied across the five districts and with the internal logistics of each district. The distinction from one district to another, in terms of subject advisors' curriculum leadership, is defined partly by the political will, capacities and the initiatives of both stakeholders (parents, learners, educators, School Governing Bodies (SGBs), universities, Non-Governmental Organisations) and the nature of leadership practised by subject advisors. One's creativity and/or innovativeness are regarded as initiative. According to Rorrer, Skrla and Scheurich (2008), skills, personnel, knowledge as well as other resources needed to execute a task is all entailed in capacity. Will encompasses motivation, and attitudes underlying one's response to a curriculum reform policy goal. The success or failure of subject advisors' curriculum leadership role in improving learner achievement results in Mathematics is characterised by the above three attributes. The major subject advisors' curriculum leadership role performed by all the subject

advisors was that one of redefining the schools' mission so that they are aligned with that of district and provincial ones. From the findings, it was evident that most educators were clear about district and/or provincial goals of improving learner achievement results in Mathematics. Although the district and provincial mission document was only available in four schools, participants seemed to be aware of it and admitted that they were involved in the mission and district action plan formulation.

Subject advisors provided professional development to educators and were also expected to be supportive and ensure ongoing quality teaching and learning of Mathematics as leaders of the curriculum. This finding echoes that Feeney (2009), who found subject advisors as being responsible for curriculum leadership and curriculum management. The study also found that subject advisors interact and associate with chief education specialists, principals, educators and SMT in their curriculum leadership of Mathematics. Educators mentioned the outstanding support that they receive from subject advisors in terms of providing resources as well as motivating both educators and learners. This finding is consistent with Fletcher and Bells' (1999) finding in the UK, that subject advisors interact with educators and principals with the hope of motivating educators and learners as well as being resource providers.

The data from the interviewed participants suggested that subject advisors were never trained formally before resuming their duties. This finding is in line with Bambi's (2012) findings in Gauteng, that subject advisors never received any formal training before they commenced their duties after they were appointed. Subject advisors prepared themselves in different ways amongst which are self-development, participating in educator professional development organisations such as Association for Mathematics Education of South Africa (AMESA) and South African Association of Science and Technology Educators (SAASTE), learning from retired and more experienced subject advisors and through acting as a subject advisor. The only professional development that subject advisors received, as revealed in this study, was a training workshop organised by the Department of Education at a level of the province. This finding is in line with Zepeda and Kruskamps' (2007) finding that subject advisors were never trained for the duties they were expected to fulfil as leaders of the curriculum.

Furthermore, the majority of the subject advisors were leading by being exemplary, they delegated tasks to senior educators and held meetings regularly to discuss challenges encountered in Mathematics teaching and learning as well as drafting strategies addressing the encountered obstacles. One subject advisor was not clear about what to look for in order to be able to empower and capacitate educators so that they can assist progressed learners to achieve more in Mathematics. This finding is line with the finding of Hammersley-Fletcher and Kirkham (2007), who found that in the UK, some subject advisors felt uncomfortable about observing lessons. In their study, Bennet *et al.* (2007) found that subject advisors were against doing classroom observations to monitor educators. They preferred to check learners' assessment achievement results and records. As revealed in this study, subject advisors judged educators based on learner achievement before providing meaningful opportunities for development. Subject advisors only checked, moderated and controlled learners and educators' workbooks in underperforming schools.

As revealed in this study, subject advisors held frequent meetings with educators and discussed learner performance and district goals as well as reflected on their previous strategies. Some subject advisors used more experienced educators to mentor and coach newly appointed and less experienced educators. Concerning challenges such as heavy workloads, educator supervision and educator evaluation, participants generally agreed that they addressed the challenges through the creation of extra time and working during weekends. Subject advisors created time for mentoring during school teaching time and at times during holidays. Subject advisors encouraged HoDs and educators to move around checking for learners who are outside their classrooms and take them back into the classrooms during their free periods. Data from the interviews revealed that subject advisors used different strategies to address the challenges that educators encountered. This finding contradicts that one of Mouza (2006), who revealed that subject advisors used the same approaches to mitigate challenges encountered during the execution of their curriculum leadership role. Some held subject meetings, where they engage in discussions with educators to find solutions collectively, some delegate and use senior and significantly experienced educators, others demonstrate lesson presentation and others have a mentor and a mentee system. It became evident in

the study that subject advisors do not operate in isolation. The interactions among subject advisors, principal, educator, learners and context are important for promoting subject advisors' effective curriculum leadership. This finding is consistent with Tams' (2010) finding in China, that the qualities of heads of a subject advisor include among others, the ability to interact with other people such as principals, parents, educators and learners in order to get relevant sources of information and ideas to make informed decisions about effective curriculum leadership which in turn influences learner achievement in Mathematics.

### **5.2.2 Summary of Finding 2: Knowledge and Information**

None of the subject advisors that were interviewed knew everything that was going on in his/her subject area. Some of the interviewed subject advisors had not majored in Mathematics or a science-related subject. The subject advisors in this study each pointed out that they needed training in one or two areas like management and leadership of progressed learners. Therefore, it is proposed that the cognitive theory offers important basics for understanding subject advisors' curriculum leadership role. Hoyle (1986a) claims that subject advisors need to take account of four variables when making decisions, namely the leader, nature of task, the situation and the educators under their control. Subject advisors learn constantly from the situation in which they find themselves daily. From the time they are appointed, subject advisors acquire knowledge about their curriculum leadership tasks subconsciously and continuously. Subject advisors' perceptions, beliefs and understanding of Mathematics curriculum leadership vary from one subject advisor to another. The fact that little time is available for educators to receive first-hand information of curriculum leadership; they are channelled to depend on the perceptions of subject advisors coupled with other sources of information such as learners and parents in both formal and informal settings. The uniqueness of the individual characteristics of subject advisors depends on the availability of resources, number of educators per district, the background of learners, social factors and support from the school principal, HoDs and educator commitment.

### **5.2.3 Summary of Finding 3: Challenges encountered by Subject Advisors in Curriculum Leadership**

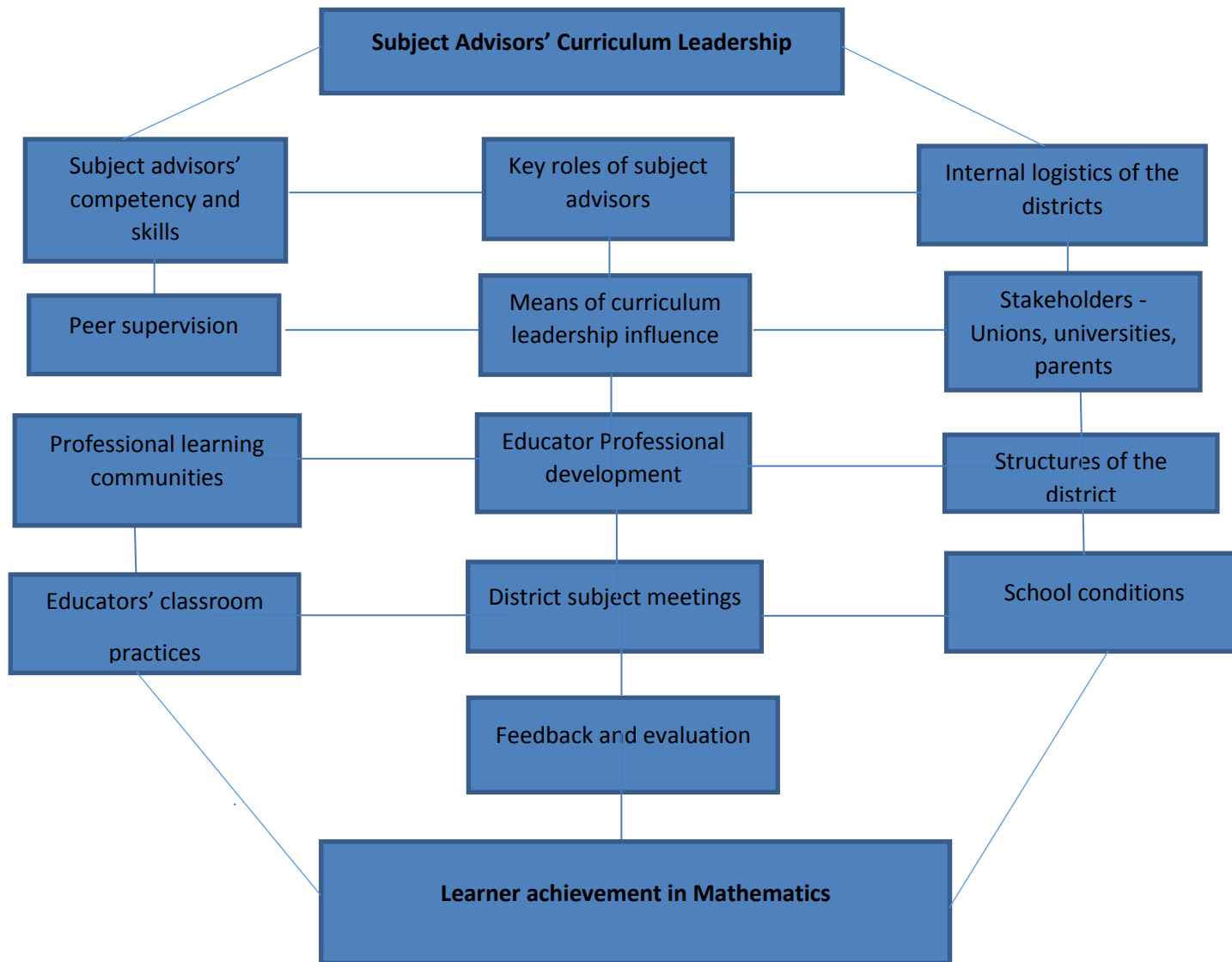
Although the responses of participants on the challenges subject advisors encounter in their curriculum leadership differed, the majority pointed out that they discussed challenges in their provincial meetings to come up with possible solutions collectively.

Subject advisors pointed out that they encountered several challenges in their curriculum leadership role such as lack of Mathematics content knowledge, educators' lack of content knowledge for the new curriculum, heavy work load, educators with low morale, educator absenteeism, progressed learners and poor learner achievement results. Some of these challenges were also revealed in a New Zealand study by Stephenson (2010), which found that enormous workload and paper work hindered the curriculum leadership role of Mathematics subject advisors. Poor learner achievement is in line with the findings of Ali and Botha (2006) in Gauteng, who found that poor learner achievement was a major challenge for subject advisors' effective curriculum leadership and that this has resulted in low educator morale. This study also revealed that educators get demotivated and become demoralised after going out an extra mile like offering extra classes, remedial classes, weekend classes and holiday classes but learners continue to fail despite the efforts. Subject advisors used different strategies and approaches when managing and leading their districts. Therefore, while all subject advisors attempt to achieve the best possible learner achievement results in Mathematics, they managed and led their schools and districts differently.

### **5.3 PROPOSED MODEL OF SUBJECT ADVISORS' CURRICULUM LEADERSHIP**

In light of the above, recommendations on ways of addressing the study's findings are presented. Figure 5.1 represents the proposed model that could be used to guide, support and train subject advisors in improving their curriculum leadership role with the aim of improving educators' classroom practices, which in turn influences learner achievement results in Mathematics.

The effectiveness of subject advisors' curriculum leadership practices was influenced by subject advisors' competency and skills, internal logistics of the districts, peer supervision, stakeholders, and structures of the districts, professional learning communities, school conditions as well as the will for educators to transform their classroom teaching practices. Collegiality, political will, capacity, unity of purpose and ingenuity of stakeholders and the types of leadership styles used by subject advisors also influenced the curriculum leadership role of subject advisors. In the five districts of the Free State province that were involved in the research, it was clear that different stakeholders were sometimes successful in raising the necessary resources to develop the capacities of subject advisors and educators with the aim of improving their teaching competencies. Effective subject advisors' curriculum leadership practices appeared to be strongly driven by strong synergies and partnerships with parents. It is suggested that the Department of Basic Education considers specifically availing the posts of the district resource coordinator who will be in charge of making sure that resources are distributed to all schools timeously. The district resource coordinators should report both at the district and provincial offices on matters pertaining to the improvement of Mathematics teaching and learning.



**Figure 5.1: Proposed model of subject advisors' curriculum leadership**

The Department of Basic Education and policy makers need to ensure that subject advisors' curriculum leadership tasks, related to improvement in learner achievement results, are placed at the heart of subject advisors giving guidance and direction to the curriculum. The study identified five areas critical areas for subject advisors as curriculum leaders that influence learner achievement results in Mathematics:

- The first area is supporting, evaluating, supervising and developing educator quality. Subject advisors should be able to mobilise educators thereby promoting teamwork in their districts as well as engaging in educator monitoring, evaluation and educators' professional growth.
- Secondly, assessment, accountability and goal setting need attention. Workshop providers, policy makers and the Department of Basic Education need to ensure that the abilities and authorities of subject advisors in planning, monitoring, evaluating and controlling both educators and learners' workbooks is maximised, utilising learner achievement results to improve practice.
- Thirdly, policy makers and the Department of Basic Education need to reconsider strategic human resources and training by providing training for subject advisors on ways of assisting and supporting progressed learners to achieve more in Mathematics. There is also need for the HR department to recruit HoDs and educators matching departmental needs with subject specific requirements.
- Fourthly, the interactions and associations of subject advisors with other districts are pivotal in subject advisors' curriculum leadership role since the associations can bring benefits to learner achievement in Mathematics. These interactions of subject advisors' curriculum leadership within schools, municipalities and districts confirms effective interaction whose meaning should be shared by other individuals with the aim of improving educators' classroom practices as claimed by Hogg and Vaughan (2011). The basic idea is that during these moments of interactions, subject advisors will learn from each other and gain good strategies, skills, methods, knowledge and classroom practices which will have an impact in the overall learner achievement in Mathematics.

- And finally, subject advisors' curriculum leadership practices and artefacts can be conceived of as any task executed as a result of collaboration between schools, principals, educators and subject advisors. The tasks are perceived as useful and relevant by these stakeholders, who were able to make decisions as well as coming up with the best way to increase efficiency and productivity from the available limited resources. This attests to the cognitive theory and curriculum leadership theory which holds that meaning is constructed through critical thinking and then shared among decision makers and implementers to achieve desired organisational goals. As subject advisors and educators interact, they determine activities that promote and improve the teaching and learning of mathematics. Their interpretation of what is best for their situation, place and context could only be understood better by the stakeholders. The manner in which curriculum leadership is viewed by subject advisors differs from district to district, indicating in most cases their capacities, ingenuities and will of giving guidance and direction to educators.

While the study concludes that the curriculum leadership role of Mathematics subject advisors provides better opportunities for improving educators' classroom practices which in turn influences learner achievement results in Mathematics, questions on the nature of activities and the manner they are performed as well as the effect they have on Mathematics teaching and learner learning cannot be generalised. The researcher is optimistic however, that lessons learned from this study can be transferred to other settings and can give solutions to schools as they strive towards improving learner achievement results in Mathematics and adding value to the current discourse of curriculum leadership.

#### **5.4 CONCLUSIONS**

The study's aim was to explore the curriculum leadership role of mathematics subject advisors for mathematics improvement in South Africa. The following conclusions may be drawn.

In the first place, the curriculum leadership role of mathematics subject advisors in South Africa takes varied forms and differs in the nature of subject advisors' activities as well as the manner in which they are executed. The curriculum leadership role of

subject advisors in this study was characterised by analysis of learner achievement results, administration, supervising and observing lessons, monitoring and controlling both educator and learner workbooks, conducting educator professional development workshops, networking with parents, goal setting, amongst other activities which many scholars have classified as key elements of curriculum leadership (see Hallinger, 2012; Hallinger & Heck, 2010; Jones, 2009; Jepketer *et al.*, 2015; Spillane, 2005). While it can then be concluded that subject advisors' curriculum leadership role has the potential of improving learner achievement results in mathematics, the nature of their curriculum leadership practices as well as the manner of performing these practices seem to vary across the five districts of the Free State in South Africa. The political will, capacities and initiatives of both district leadership and stakeholders seems to differentiate each subject advisor from another in terms of artefacts and curriculum leadership practices. One's innovativeness and/or creativity are referred to as initiative, whereas knowledge, personnel, resources and other skills to execute a task entails capacity. Rorrer *et al.* (2008) views will as encompassing motivation, beliefs and attitude which underlie one's response to a policy goal. The poor performance or success of subject advisors' curriculum leadership role is characterised by the above three attributes (initiative, capacity and will). Defining the school mission as well as target setting were the major curriculum leadership activities undertaken by subject advisors. From the findings, it was evident that most educators were clear about district goals for improving the teaching and learning of Mathematics. Educators seemed to be aware of the district mission and admitted that they were actively involved in the formulation of the mission and district action plans even though the district mission document was not available in all the different ten secondary schools studied. However, from the analysed interview, observation and document data, it became evident that very few of the subject advisors seemed to be doing well on the curriculum leadership role of providing instructional artefacts as well as creating a positive climate.

Subject advisors and educators felt that rewards or incentives to motivate them to teach and learn effectively were not adequate particularly in the context of the rather declining economy in South Africa. In this case, as the economic situation in the country deteriorates, the conclusion to be drawn is that the curriculum leadership role of subject advisors appears to be at risk of being less effective and less efficient.

More innovative and creative ways of motivating subject advisors, educators and learners need to be explored, to improve the effectiveness and efficiency of the curriculum leadership role of subject advisors.

Supervision forms, CAPS policy, subject advisors' moderation reports and tests were the only curriculum leadership artefacts provided. Only rarely were laptops and tablets which are regarded as important curriculum leadership tools or artefacts, provided for data storage in South Africa secondary schools especially in remote and disadvantaged schools. Consequently, educators ended up using their personal cell phones, laptops and data in order for them to receive and access instructional information from subject advisors and as a result, educators felt that this was a costly exercise.

The effectiveness of subject advisors' curriculum leadership role is largely influenced by unity of purpose, collegiality, capacity, political will and ingenuity of district or provincial leadership as argued earlier. Rorrer *et al.* (2008) also observed these factors as being visible at the district and/or provincial site. Subject advisors, school principals, heads of departments, educators, learners and parents work together to define their own goals, specify standards and work towards maintaining it, where there is collegiality. In the ten secondary schools studied, it was clear that various stakeholders such as School Governing Bodies (SGBs) were sometimes successful in fundraising for educators to attend professional development workshops with the hope of developing the capacities of educators to improve their teaching competencies. Stakeholders in other schools also organised and funded career exhibitions trips of their learners, motivational sessions and learner camps with the aim of improving learner achievement results in mathematics. Strong synergies and partnership with parents and other stakeholders seem to be a strong driver of effective subject advisors' curriculum leadership role.

Another role which was moderately executed by subject advisors was monitoring instruction. The activities of the subject advisors in this role amongst others included analysis of schools' tests, administration, organising educator professional development workshops as well as peer lesson observation. The frequency with which subject advisors engaged in the activities and for instance, the types of educator professional development differed from subject advisor to subject advisor.

Seemingly, these variations suggest that subject advisors had considerable autonomy to draft and redefine some of their roles, including the autonomy to decide on how, what and where to do so as long as the activity improved learner achievement results in mathematics. More work is needed however, as a way of ensuring that educator professional development activities of subject advisors address the core activities of teaching and learning in schools by engaging educators in more interactive professional development workshops focusing on pedagogical content knowledge. From the analysed data, it was not clear that any of the subject advisors had managed to shape their curriculum leadership practices to connect more tightly with the teaching and learning of mathematics.

## **5.5 RECOMMENDATIONS**

An important feature of subject advisors' curriculum leadership role is their awareness of the social context in which they are working as well as their interactions with district officials, principals, educators and learners, with the hope of improving learner achievement in Mathematics. As reasoned by Dean (2002) and Tremblay (2017), subject advisors giving guidance and direction to the curriculum should be based on subject advisors' abilities, skills and knowledge as opposed to merely their positions. Subject advisors need to create conditions and opportunities for promoting effective teaching and learning of Mathematics, which in turn influences learner achievement in Mathematics.

Recommendations are offered in light of summaries of findings from the qualitative data analysis process.

✓ Firstly, it is recommended that subject advisors need to specify aspects of concepts and the way they understand issues such as features of better and improved teaching and learning practices in order to maintain, improve and sustain quality teaching and learning as revealed in learner achievement results in Mathematics. The researcher strongly feels there was need for the subject advisors to arrange meetings with educators, learners and learners' parents to address issues with learner achievement and motivation. It seems that there has been no follow up after identifying challenges with the achievement of certain learners.

✓ This study has revealed that subject advisors, as curriculum leaders, can make a difference in learner achievement in Mathematics provided they are given the

necessary support, power and authority of making crucial decisions. Subject advisors should be given more authority and power by the Department of Education and school principals. It must be noted that power and authority alone cannot lead to improved learner achievement in Mathematics automatically. It is recommended that the curriculum leadership role of the subject advisors be redefined. Subject advisors' curriculum leadership role needs to be reviewed and redefined from an understanding of practices with a higher likelihood of improving learner achievement in Mathematics.

✓ It is recommended that the workload of subject advisors be reduced with the Department of Education encouraging schools to integrate educator mentoring in every day teaching activities. This will prevent the problem of filling in educator professional development forms when they are needed by the district offices, without necessarily having done the real processes of mentoring that is classroom observations. Subject advisors need to develop educator mentoring systems and strategies for assisting and supporting educators in their districts. Educator appraisal has to concentrate on issues that lead to an improvement of educators' classroom practices, skills and strategies with the hope of improving learner achievement results in mathematics.

✓ Thirdly, although subject advisors offer guidance and direction to policy in schools, successful implementation depends on attitudes, perceptions, motives and eagerness of educators who are policy implementers at the level of the school. In order to have successful implementation and institutionalisation of reform policies, it is recommended that subject advisors, as curriculum leaders, create conditions and opportunities favouring and promoting effective teaching and learning of Mathematics. Subject advisors as leaders of the curriculum need to be actively engaged and involved in the formulation of policies, if not, it is unlikely that they will engage their educators and learners in the implementation process of the reform policies. Continuous and effective communication between policy makers and curriculum leaders is crucial for successful implementation of curriculum reform policies.

✓ Also, it is recommended that subject advisors undergo initial leadership training. The fact of whether initial training of subject advisors is compulsory or not will depend on policy makers and the Department of Education. The provincial department of education can define provincial plans and integrate with districts and

schools and develop with incentives to ensure that subject advisors as leaders of the curriculum are actively and willingly engaged.

✓ It is also recommended that efforts be made to recruit individuals as subject advisors with suitable qualifications and who majored in Mathematics. On-the-job training needs to be viewed in the context of prior learning opportunities for subject advisors as leaders of the curriculum. In cases that do not require initial leadership training initiatives, on-the-job training should promote development of subject advisors' leadership skills and practice. Off-the-job training also needs to be allocated to subject advisors periodically, so that they can update their skills and knowledge to keep up with new developments in curriculum leadership practices. Networking, both virtual and real can also provide informal development needs of subject advisors.

✓ It is recommended that there is consistency of provision by service providers. Although the Department of Education caters for training and curriculum needs, the workshops and trainings need to be done continuously. As revealed in this study, subject advisors offered trainings and workshops to educators; however, the frequency and consistency needs to improve and the training should cater for both educator and learner needs. Some schools had more workshop training than others but lacked applicability in educators' school settings. It is important in this regard for workshop providers to offer trainings focusing both on learner and educator needs.

✓ Emerging data pointed out that subject advisors knew what was happening in his/her learning area as a curriculum leader. However, there are still challenges to be addressed such as learner progression. It is in this vein that it is recommended that continuous training and professional development of subject advisors as curriculum leaders, is needed to cater for both educator and learner needs.

## **5.6 RECOMMENDATIONS FOR FUTURE RESEARCH**

The importance of subject advisors as curriculum leaders in facilitating and ensuring the manner educators teach learners effectively in Mathematics was re-affirmed by the study. Future research needs to focus on and explore the curriculum leadership role of subject advisors in supporting deputy principals. There is also need for researchers to re-examine the curriculum leadership role of chief education specialists with the hope of relieving subject advisors from their non-curriculum

leadership responsibilities. It is thus recommended that the following topics be considered for future research:

- Exploring the curriculum leadership role of chief education specialists
- The instructional leadership role of deputy principals
- Continuous professional development and training of subject advisors
- Exploring the link between the curriculum leadership role of Mathematics subject advisors and academic achievement of Mathematics results at exit point of secondary schools in South Africa that make use of mixed methods.

## **5.7 CONCLUDING REMARKS**

Giving guidance and direction to the curriculum should be at the centre of every institution (schools). The need to give subject advisors more power and authority to ensure that greater attention is placed on effective teaching and learning of Mathematics, which in turn influences learner achievement, has made it crucial to reconsider exploring subject advisors' curriculum leadership role. Policy and practice explain the reasons subject advisors' curriculum leadership has become a key priority in South African secondary schools, since when policy and practice are taken together, they contribute to increased learner achievement results in Mathematics. The need to improve learner achievement in Mathematics while accommodating diversified learners such as progressed learners, puts subject advisors under pressure. Consequently, the curriculum leadership role of subject advisors is increasingly defined and shaped by a series of demanding responsibilities.

In South African secondary schools today, one of the most significant issues confronting education is a need for restoring a sound culture of quality teaching and learning, which in turn influences learner achievement in Mathematics. This desire of restoring a sound culture of quality teaching and learning has resulted in acknowledging the exploration of subject advisors' curriculum leadership role in supporting the provision of quality education in secondary schools. The restructuring of schools to empower educators has resulted in the decentralisation and distribution of leadership, keeping subject advisors' curriculum leadership at the centre of teaching and learning practices. Transformations due to policies as an initiative of enhancing a collaborative culture of effective teaching and learning have resulted in

changes in the curriculum leadership role of subject advisors. Subject advisors' crucial role as curriculum leaders in all the initiatives of a school and the effect it has on the morale of educators as well as the creation of an environment conducive for teaching and learning, is pivotal in the process of building a culture of teaching and learning, which in turn influences learner achievement results in Mathematics. Linked to building a culture of teaching and learning is ensuring that educators are fully equipped with the relevant subject content and pedagogical content knowledge to fulfil their role as teachers of Mathematics.

Subject advisors, as curriculum leaders, play a pivotal role in ensuring the quality of teaching and learning, which in turn influences learner achievement in Mathematics. However, while subject advisors have a sense of their role as curriculum leaders, findings illustrate that factors such as rigid educational policies, progressed learners, and educator unions as well as the uneven distribution of power within their districts and schools, hampered subject advisors' effectiveness. In addition, subject advisors seem incapable of functioning effectively in schools as curriculum leaders because of lack of training and inappropriate training in the context of current educational reform policies. The findings imply a need for greater capacity building of subject advisors focusing on nurturing and unfolding their potential as curriculum leaders to improve effective teaching and learning. The way in which educator professional development programmes for subject advisors are structured and delivered in essence should be reconceptualised by service providers. The findings are, therefore, important for the formulation and implementation of district and school-based capacity building policies and for the design of educator professional development programmes supporting subject advisors' curriculum leadership.

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## APPENDICES

### Appendix A: Request for Permission to Conduct Research with Mathematics Educators

House Number 27  
Heldercrest  
Johannesburg  
1510  
31 August 2018

The Mathematics Educator

#### REQUEST FOR PERMISSION TO CONDUCT RESEARCH

Dear Sir/ Madam

I hereby request permission to conduct research with you (as the Mathematics educator) in your school.

My name is Thabo Sithole and I am currently studying for a PhD degree in Mathematics with the University of the Free State. As part of my PhD programme, I am required to conduct research on an aspect of interest with a view of making a contribution to our knowledge and understanding of the issue under study. The title of my research project is:

#### ***CURRICULUM LEADERSHIP ROLE OF SUBJECT ADVISORS FOR MATHEMATICS IMPROVEMENT IN SOUTH AFRICA***

The purpose of the study is to explore and get an understanding of mathematics subject advisors' perceptions and ideas regarding Mathematics curriculum and their practices of leadership thereof. I am interested specifically in the manner subject advisors make sense of National Curriculum and Assessment Policy Statement (CAPS), which is the current Mathematics reform policy, their practices of leadership, roles as well as opportunities and challenges that they encounter during their leadership and the manner their understanding of CAPS influences their curriculum leadership. The study has got the potential to benefit subject advisors leading the implementation of CAPS and policymakers by pointing out the challenges, successes and the needs for supporting subject advisors' curriculum leadership in secondary schools.

The study will involve 1) interviews with Mathematics subject educators, at a time that is convenient to them and these interviews will be audio recorded for the sake of

analysis and with prior permission; 2) observing their departmental meetings and workshops facilitated by the subject advisors; 3) analysis of their minutes of meetings, and 4) subject departmental policies, in order to assess the departmental objectives, visions and targets, if there are any. The interviews are expected to last no longer than 60 minutes per session and will take place after school hours, whereas the departmental meeting observations will be scheduled in a manner that will not cause disruption to both the educators' and schools' programme.

I undertake to observe confidentiality and to protect participants from physical and or psychological harm. No names of the schools and or persons shall be used in any reports of the research. All participants will be asked to participate voluntarily in the study and may withdraw at any time should they so wish.

Upon the completion of the study, I undertake to provide the Free State Department of Education with a copy of the research report and to share my findings with Mathematics subject advisors and educators in the secondary schools as necessary. I have already applied for and received permission from the Free Department of Education to conduct the study.

If you need any further information and or have suggestions, please do not hesitate to contact me and or my research supervisor Dr Tachie at **TachieSA@ufs.ac.za** or **tachiesa@ufs.ac.za** or + **27514017521**.

Your support and attention in this matter will be highly appreciated.

Yours sincerely

Thabo Sithole

Cell: 071 914 3238 OR 062 552 3239

Email: thabofrance@ymail.com

A handwritten signature in black ink, appearing to read 'Thabo Sithole', with a large, sweeping flourish above the name.

If you agree to participate in the research study entitled:

**CURRICULUM LEADERSHIP ROLE OF SUBJECT ADVISORS FOR MATHEMATICS IMPROVEMENT IN SOUTH AFRICA**

Please complete the attached consent form

- *I hereby give free and informed consent to participate in the above-mentioned research study.*
- *I understand what the study is about, and why I have been chosen to participate.*
- *I understand what the potential benefits and risks are.*
- *I give the researcher permission to make use of the information collected from my participation, for research purposes only.*

**Participant's Signature -----Date-----**

**Researcher's Signature-----Date-----**

## **Appendix B: Request for Permission to Conduct Research in Schools**

House Number 27  
Heldercrest  
Johannesburg  
1510  
31 August 2018

The School Principal

### **REQUEST FOR PERMISSION TO CONDUCT RESEARCH**

Dear Sir/ Madam

I hereby request permission to conduct research with the Mathematics educator in your school.

My name is Thabo Sithole and I am currently studying for a PhD degree in Mathematics with the University of the Free State. As part of my PhD programme, I am required to conduct research on an aspect of interest with a view of making a contribution to our knowledge and understanding of the issue under study. The title of my research project is:

#### ***CURRICULUM LEADERSHIP ROLE OF SUBJECT ADVISORS FOR MATHEMATICS IMPROVEMENT IN SOUTH AFRICA***

The purpose of the study is to explore and get an understanding of subject advisors' perceptions and ideas regarding Mathematics curriculum and their practices of leadership thereof. I am interested specifically in the manner subject advisors make sense of National Curriculum and Assessment Policy Statement (CAPS), which is the current Mathematics reform policy, their practices of leadership, roles as well as opportunities and challenges that they encounter during their leadership and the manner their understanding of CAPS influences their curriculum leadership. The study has got the potential to benefit subject advisors and educators leading the implementation of CAPS and policymakers by pointing out the challenges, successes and the needs for supporting subject advisors' curriculum leadership in secondary schools.

The study will involve 1) interviews with Mathematics educators, at a time that is convenient to them and these interviews will be audio recorded for the sake of

analysis and with permission; 2) observing their departmental meetings and workshops facilitated by the subject advisors; 3) analysis of their minutes of meetings, and 4) subject departmental policies, in order to assess the departmental objectives, visions and targets, if there are any. The interviews are expected to last no longer than 60 minutes per session and will take place after school hours, whereas the departmental meeting observations will be scheduled in a manner that will not cause disruption to both the educators' and schools' programme.

I undertake to observe confidentiality and to protect participants from physical and or psychological harm. No names of the schools and or persons shall be used in any reports of the research. All participants will be asked to participate voluntarily in the study and may withdraw at any time should they so wish.

Upon the completion of the study, I undertake to provide the Free State Department of Education with a copy of the research report and to share my findings with Mathematics subject advisors and educators in the secondary schools as necessary. I have already applied for and received permission from the Free Department of Education to conduct the study.

If you need any further information and or have suggestions, please do not hesitate to contact me and or my research supervisor Dr Tachie at **TachieSA@ufs.ac.za** or **tachiesa@ufs.ac.za** or + **27514017521**.

Your support and attention in this matter will be highly appreciated.

Yours sincerely

Thabo Sithole

Cell: 071 914 3238 OR 062 552 3239

Email: thabofrance@ymail.com



**RESPONSE FROM PRINCIPAL**

I hereby grant you permission to conduct your research in my school

Name of principal: -----

Signature: -----

Date: -----

**Appendix C: Request for Permission to Conduct Research with Mathematics Subject Advisor**

House Number 27  
Heldercrest  
Johannesburg  
1541  
31 August 2018

The Mathematics Subject Advisor

**REQUEST FOR PERMISSION TO CONDUCT RESEARCH**

Dear Sir/ Madam

I hereby request permission to conduct research with you as the Mathematics subject advisor in your district.

My name is Thabo Sithole and I am currently studying for a PhD degree in Mathematics with the University of the Free State. As part of my PhD programme, I am required to conduct research on an aspect of interest with a view of making a contribution to our knowledge and understanding of the issue under study. The title of my research project is:

***CURRICULUM LEADERSHIP ROLE OF SUBJECT ADVISORS FOR MATHEMATICS IMPROVEMENT IN SOUTH AFRICA***

The purpose of the study is to explore and get an understanding of subject advisors' perceptions and ideas regarding Mathematics curriculum and their practices of leadership thereof. I am interested specifically in the manner subject advisors make sense of National Curriculum and Assessment Policy Statement (CAPS), which is the current Mathematics reform policy, their practices of leadership, roles as well as opportunities and challenges that they encounter during their leadership and the manner their understanding of CAPS influences their curriculum leadership. The study has got the potential to benefit subject advisors leading the implementation of CAPS and policymakers by pointing out the challenges, successes and the needs for supporting subject advisors' curriculum leadership in secondary schools.

The study will involve 1) interviews with Mathematics subject advisors, at a time that is convenient to them and these interviews will be audio recorded for the sake of analysis and with permission; 2) observing meetings or workshops facilitated by the

subject advisor; 3) analysis of their minutes of meetings, and 4) subject departmental policies, in order to assess the departmental objectives, visions and targets, if there are any. The interviews are expected to last no longer than 60 minutes per session and will take place after school hours, whereas the departmental meeting observations will be scheduled in a manner that will not cause disruption to both the educators' and schools' programme.

I undertake to observe confidentiality and to protect participants from physical and or psychological harm. No names of the schools and or persons shall be used in any reports of the research. All participants will be asked to participate voluntarily in the study and may withdraw at any time should they so wish.

Upon the completion of the study, I undertake to provide the Free State Department of Education with a copy of the research report and to share my findings with Mathematics subject advisors and educators in the secondary schools as necessary. I have already applied for and received permission from the Free Department of Education to conduct the study.

If you need any further information and or have suggestions, please do not hesitate to contact me and or my research supervisor Dr Tachie at **TachieSA@ufs.ac.za** or **tachiesa@ufs.ac.za** or + **27514017521**.

Your support and attention in this matter will be highly appreciated.

Yours sincerely

Thabo Sithole

Cell: 071 914 3238

Email: thabofrance@ymail.com

A handwritten signature in black ink, appearing to read 'Thabo Sithole', with a large, sweeping flourish above the name.

If you agree to participate in the research study entitled:

**CURRICULUM LEADERSHIP ROLE OF SUBJECT ADVISORS FOR MATHEMATICS IMPROVEMENT IN SOUTH AFRICA**

Please complete the attached consent form

- *I hereby give free and informed consent to participate in the above-mentioned research study.*
- *I understand what the study is about, and why I have been chosen to participate.*
- *I understand what the potential benefits and risks are.*
- *I give the researcher permission to make use of the information collected from my participation, for research purposes only.*

**Participant's Signature -----Date-----**

**Researcher's Signature-----Date-----**

## **Appendix D: Request for Permission from Department of Education to Conduct Research**

House Number 27  
Heldercrest  
Johannesburg  
1541  
31 August 2018

The Chief Education Specialist  
Policy Studies and Research  
Free State Department of Education  
Bloemfontein  
9300

### **REQUEST FOR PERMISSION TO CONDUCT RESEARCH**

Dear Sir/ Madam

I hereby request permission to conduct research with selected Mathematics subject advisors and educators in the five districts of the Free State province.

My name is Thabo Sithole and I am currently studying for a PhD degree in Mathematics with the University of the Free State. As part of my PhD programme, I am required to conduct research on an aspect of interest with a view of making a contribution to our knowledge and understanding of the issue under study. The title of my research project is:

#### ***CURRICULUM LEADERSHIP ROLE OF SUBJECT ADVISORS FOR MATHEMATICS IMPROVEMENT IN SOUTH AFRICA***

The purpose of the study is to explore and get an understanding of subject advisors' perceptions and ideas regarding Mathematics curriculum and their practices of leadership thereof. I am interested specifically in the manner subject advisors make sense of National Curriculum and Assessment Policy Statement (CAPS), which is the current Mathematics reform policy, their practices of leadership, roles as well as opportunities and challenges that they encounter during their leadership and the manner their understanding of CAPS influences their curriculum leadership. The study has got the potential to benefit subject advisors and educators leading the implementation of CAPS and policymakers by pointing out the challenges, successes and the needs for supporting subject advisors' curriculum leadership in secondary schools.

The study will involve 1) interviews with Mathematics subject advisors and educators, at a time that is convenient to them and these interviews will be audio recorded for the sake of analysis and with permission from the interviewees; 2) observing their departmental meetings and workshops facilitated by the subject advisors; 3) analysis of their minutes of meetings, and 4) subject departmental policies, in order to assess the departmental objectives, visions and targets, if there are any. The interviews are expected to last no longer than 60 minutes per session and will take place after school hours, whereas the departmental meeting observations will be scheduled in a manner that will not cause disruption to both the educators' and schools' programme.

I undertake to observe confidentiality and to protect participants from physical and or psychological harm. No names of the schools and or persons shall be used in any reports of the research. All participants will be asked to participate voluntarily in the study and may withdraw at any time should they so wish.

Upon the completion of the study, I undertake to provide the Free State Department of Education with a copy of the research report and to share my findings with Mathematics subject advisors and educators in the secondary schools as necessary. I have already applied for and received permission from the Free State Department of Education to conduct the study.

If you need any further information and or have suggestions, please do not hesitate to contact me and or my research supervisor Dr Tachie at **TachieSA@ufs.ac.za** or **tachiesa@ufs.ac.za**

or + **27514017521**

Your support and attention in this matter will be highly appreciated.

Yours sincerely

Thabo Sithole

Cell: 071 914 3238 OR 062 552 3239

Email: thabofrance@ymail.com

## Appendix E: Interview Protocol: Mathematics Subject Advisors

**[NOTE: The questions may require several sessions and some may be answered together during the conversations with the Mathematics subject advisors]**

Name of Interviewee-----

Name of school-----

District-----

Date-----

1. How long have you been teaching? How long have you been teaching Mathematics specifically – at what levels?
2. How long have you been a Mathematics subject advisor?
3. What are your academic and professional qualifications (Listen to hear if majored in Mathematics at tertiary level. If not probe: what were your major subjects)?
4. How did you become a Mathematics subject advisor in this district? What position (s) did you hold before becoming a Mathematics subject advisor? What experience do you have with Mathematics curriculum leadership?
5. What is your role as a Mathematics subject advisor? [Listen to the activities they prioritise and if there is an order of priority e.g administration work versus teacher support].
6. As a Mathematics subject advisor, what do you understand to be your role in supporting teaching and learning in your district? Please explain.
7. What do you actually do to support and manage Mathematics teaching and learning in your district? Please elaborate.
8. How do you involve others / collaborate with others as you support and lead Mathematics teaching and learning in your district?
9. What are the barriers / challenges (from educators, DoE, learners, unions, parents) that you experience as you enact your leadership and support practices of Mathematics teaching and learning in your district? Please elaborate.

10. How do you overcome the challenges that you experience as you support and lead Mathematics teaching and learning in your district?
11. How were your tasks and functions as a subject advisor communicated to you when you started as a Mathematics subject advisor?
12. What training did you receive to perform your role as a Mathematics subject advisor?
13. What do you see as the best strategies for leading Mathematics in this district? Why are these especially good strategies? Are these the strategies that you are using in this district? How long have you been using these strategies? What personnel and material do you need to carry out these strategies? What characteristics make these strategies the most appropriate?
14. What are the district priorities for Mathematics curriculum leadership? How were these issues identified as priorities?
15. How are you planning to address those priorities? What do you see as the big challenges in meeting these priorities?
16. What changes have been made in this district for the last five years in terms of Mathematics teaching and learning?
17. What were those changes about?
18. What did people in the district do to ensure that those changes take place?
19. What is your role as the Mathematics subject advisor in supporting these changes (probe: in connection to the creation of a mission, vision, recruitment, developing of internal expertise and structural changes)?
20. How does the district director support you in addressing these changes?
21. Who else supports your efforts in addressing these priorities?
22. What is the district role in supporting the implementation of the Mathematics curriculum in this district?
23. What management and leadership responsibilities do you have at the district?
24. How often do you have subject meetings?
25. What do you see as the subject advisors' role in helping teachers to change their teaching practices? How do you do it?
26. How does the district assist educators to change their teaching practices?

27. What opportunities do you have to provide Mathematics curriculum leadership guidance to educators?
28. What challenges do you encounter when providing Mathematics curriculum leadership guidance to educators?
29. How is district professional development coordinated with the curriculum change?
30. What do you see as the educators' strength and weaknesses in implementing the curriculum? What variations are there?
31. Do you have any teacher in your district who poses challenges of competency? How do you know that the teacher has these challenges? [listen to hear if appraisals are done and how they are done]
32. How do you assist such educators (if there are any)?
33. Do you as the district engage educators in professional development? Give me some examples.
34. What forms does educator development take on and when do you do it? (Listen to hear if it is during the holidays? After school, etc?). Does it meet the development needs of educators?
35. What problems do you encounter with staff development in this district?
36. In this year alone, have you personally received any professional development? If yes, from whom and when? Describe the training for me.
37. What did you like most about the training provided?
38. What aspects of your work did it address?
39. What aspects of that training were you not happy about?
40. Are there some other areas that you still need more training? Why? Which ones?
41. In general, what makes your work as a subject advisor difficult?
42. What makes the work exciting for you?
43. What kinds of interactions do you have with the district officials? What are some of the topics you might cover in those conversations?
44. What kinds of impact do district officials have on your leadership of Mathematics in your district?
45. What about their influence on the teaching and learning of Mathematics in schools within this district generally?

46. What kinds of interactions do you have with educators in your schools? What are some of the topics you might cover in those conversations? (Give me an example).
47. What do you see as your impact on educators' teaching of Mathematics in the district? Give me an example to illustrate what you mean.
48. What kinds of interactions do you have with the school principals? What are some of the topics you might cover in those conversations?
49. What kinds of impact do school principals have in the teaching and learning of Mathematics in this district?
50. How do you think the national and provincial test programs influence the Mathematics teaching and learning in your district? Give some examples to illustrate what you mean.
51. A lot of people are talking about the "Mathematics for All". Have you heard this? From where?
52. What does this mean to you?
53. Do most people in this district agree about this?
54. What does it mean in this district? Has the district done anything to make this happen?
55. What else needs to happen for "Mathematics for All" to be realised?
56. Is this something you think this district can realise? How? Is this something this district cherishes?
57. What do you think of the Mathematics for All campaign? What things are you doing that are related to the Mathematics for All campaign? How did you find about the Mathematics for All campaign?
58. What are the differences in your leadership style for the NCS and the NCAPS curriculum? (if any)
59. When thinking about your role as a Mathematics subject advisor, if you had the chance to go back in time, is there anything you would do differently?
60. In conclusion, is there anything else about your work that we have not covered which you would like to discuss and share with me as a researcher on Mathematics teaching and learning?
61. Can I contact you again if I need more information?



## Appendix F: Interview Protocol: Mathematics Educators

**[NOTE: The questions may require several sessions and some may be answered together during the conversations with the Educators]**

Name of Interviewee-----

Name of school-----

District-----

Date-----

1. How long have you been teaching? How long have you been teaching Mathematics specifically – at what levels?
2. What are your academic and professional qualifications (Listen to hear if majored in Mathematics at tertiary level. If not probe: what were your major subjects)?
3. How did you become a Mathematics educator in this school? What subject (s) did you taught before teaching Mathematics? What experience do you have with Mathematics teaching and learning?
4. What is your role as a Mathematics educator? [Listen to the activities they prioritise and if there is an order of priority e.g administration work versus teaching].
5. How were your tasks and functions as an educator communicated to you when you started as a Mathematics educator?
6. What training did you receive to perform your role as a Mathematics educator?
7. What do you see as the best strategies for teaching Mathematics in this school? Why are these especially good strategies? Are these the strategies that you are using in this school? How long have you been using these strategies? What personnel and material do you need to carry out these strategies? What characteristics make these strategies the most appropriate?
8. What are the school priorities for Mathematics teaching and learning? How were these issues identified as priorities?

9. How are you planning to address those priorities? What do you see as the big challenges in meeting these priorities?
10. What changes have been made here in the last five years in terms of Mathematics teaching and learning?
11. What were those changes about?
12. What did people in the school do to ensure that those changes take place?
13. What is your role as the Mathematics educator in supporting these changes (probe: in connection to the creation of a mission, vision, recruitment, developing of internal expertise and structural changes)?
14. How does the principal support you in addressing these changes?
15. Who else supports your efforts in addressing these priorities?
16. What is the subject advisors' role in supporting the implementation of the Mathematics curriculum in this school?
17. What management and leadership responsibilities do you have at school?
18. How often do you have subject meetings?
19. Tell me about your day-to-day time table? [can I see a copy if you have it with you] [Probe: I notice that your time table is quite full. When do you get time to focus on leadership activities?]
20. Give me an example of how you balance your teaching and leadership activities each day?
21. What do you see as the subject advisors' role in helping teachers to change their teaching practices? How do they do it?
22. How does the district assist educators to change their teaching practices?
  - a. What opportunities do you have to provide Mathematics teaching and learning to learners?
  - b. What challenges do you encounter when providing Mathematics curriculum leadership guidance to learners?
  - c. How is district professional development coordinated with the curriculum change?
23. What do you see as the subject advisors' strength and weaknesses in implementing the curriculum? What variations are there?
24. Do you have any teacher in your department who poses challenges of competency? How do you know that the teacher has these challenges? [listen to hear if appraisals are done and how they are done]

25. How do you assist such educators (if there are any)?
26. Do you as the staff at this school engage in staff development? Give me some examples.
27. What forms does staff development take on and when do you do it? (Listen to hear if it is during the holidays? After school, etc?). Does it meet the development needs of educators?
28. What problems do you encounter with staff development at the school?
29. In this year alone, have you personally received any professional development? If yes, from whom and when? Describe the training for me.
30. What did you like most about the training provided?
31. What aspects of your work did it address?
32. What aspects of that training were you not happy about?
33. Are there some other areas that you still need more training? Why? Which ones?
34. In general, what makes your work as an educator difficult?
35. What makes the work exciting for you?
36. What kinds of interactions do you have with the subject advisors? What are some of the topics you might cover in those conversations?
37. What kinds of impact do subject advisors have on your Mathematics teaching and learning in your school?
38. What about their influence on the teaching and learning of Mathematics in schools within this district generally?
39. What kinds of interactions do you have with educators in your school? What are some of the topics you might cover in those conversations? (Give me an example).
40. What do you see as your impact on educators' teaching of Mathematics in the school? Give me an example to illustrate what you mean.
41. What kinds of interactions do you have with the school principal? What are some of the topics you might cover in those conversations?
42. What kinds of impact does the school principal have in the teaching and learning of Mathematics at this school?
43. How do you think the national and provincial test programs influence the Mathematics teaching and learning in your school? Give some examples to illustrate what you mean.

44. A lot of people are talking about the “Mathematics for All”. Have you heard this?  
From where?
45. What does this mean to you?
46. Do most people in this school agree about this? What does it mean in this school? Has the school done anything to make this happen?
47. What else needs to happen for “Mathematics for All” to be realised?
48. Is this something you think this school can realise? How? Is this something this school cherishes?
49. What do you think of the Mathematics for All campaign? What things are you doing that are related to the Mathematics for All campaign? How did you find about the Mathematics for All campaign?
50. What are the differences in your teaching style for the NCS and the NCAPS curriculum? (if any)
51. When thinking about your role as a Mathematics educator, if you had the chance to go back in time, is there anything you would do differently?
52. Is there anything else about your work that we have not covered which you would like to discuss?
53. Can I contact you again if I need more information?

A handwritten signature in black ink, appearing to be 'A. M. M.', written in a cursive style.

**Appendix G: Demographic Information of Participants (Educators)**

<b>INFORMATION</b>	<b>SCHOOL A</b>	<b>SCHOOL B</b>	<b>SCHOOL C</b>	<b>SCHOOL D</b>	<b>SCHOOL E</b>	<b>SCHOOL F</b>	<b>SCHOOL G</b>	<b>SCHOOL H</b>
<b>SEX: FEMALE</b>								
MALE								
<b>RACE: COLOURED</b>								
BLACK								
WHITE								
INDIAN								
OTHERS (SPECIFY)								
<b>AGE: 25 – 30</b>								
31 – 40								
41- 50								
50>								
<b>EXPERIENCE AS HOD:</b>								
1 -5								
6 – 10								
11 – 15								
16 -20								
21 >								
<b>QUALIFICATIONS</b>								

<b>INFORMATION</b>	<b>SCHOOL A</b>	<b>SCHOOL B</b>	<b>SCHOOL C</b>	<b>SCHOOL D</b>	<b>SCHOOL E</b>	<b>SCHOOL F</b>	<b>SCHOOL G</b>	<b>SCHOOL H</b>
GRADE 12 + DIPLOMA								
HIGHER DIPLOMA								
B.ED. DEGREE								
B.S.C. DEGREE								
B.COM. DEGREE								
B. ED. HONS								
BSC. HONS								
B.COM. HONS								
M.ED. MASTERS								
BSC. MASTERS								
B.COM. MASTERS								
PHD:(Please specify)								

**Appendix H: Demographic Information of Participants (Subject Advisors)**

<b>INFORMATION</b>	<b>DISTRICT A</b>	<b>DISTRICT B</b>	<b>DISTRICT C</b>	<b>DISTRICT D</b>	<b>DISTRICT E</b>
<b>SEX: FEMALE</b>					
MALE					
<b>RACE:</b>					
COLOURED					
BLACK					
WHITE					
INDIAN					
OTHERS (SPECIFY)					
<b>AGE: 25 – 30</b>					
31 – 40					
41- 50					
50>					
<b>EXPERIENCE</b>					
<b>AS HOD:</b>					
1 -5					
6 – 10					
11 – 15					

<b>INFORMATION</b>	<b>DISTRICT A</b>	<b>DISTRICT B</b>	<b>DISTRICT C</b>	<b>DISTRICT D</b>	<b>DISTRICT E</b>
16 -20					
21 >					
<b>QUALIFICATION S</b>					
GRADE 12 + DIPLOMA					
HIGHER DIPLOMA					
B.ED. DEGREE					
B.S.C. DEGREE					
B.COM. DEGREE					
B. ED. HONS					
BSC. HONS					
B.COM. HONS					
M.ED. MASTERS					
BSC. MASTERS					
B.COM. MASTERS					
PHD:(Please specify)					











**Appendix N: Proof of Editing**

**To whom it may concern**

This letter serves to confirm that editing and proofreading was done for:

**THABO FRANCE SITHOLE**

**University of South Africa**

**Doctoral Thesis**

**Curriculum Leadership Role of Subject Advisors for Mathematics Improvement  
in South Africa**



Cilla Dowse  
23 March 2021

**Cilla Dowse**

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