

**An exploration of teaching strategies in teaching
area and perimeter in grade 6 at
Mahlabathini Circuit Management Centre**

BY

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**A thesis submitted in partial fulfilment of the Academic Requirements for the
Degree of Masters of Education in the Curriculum Studies**

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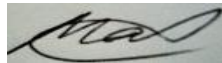
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Declaration

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I, Celenkosini Henry Madide, declare that “**An exploration of teaching strategies in teaching area and perimeter in grade 6 at Mahlabathini Circuit Management Centre**” is my own work and that all references that I have consulted have been indicated and acknowledged in accordance with the university requirements. This thesis has not been accepted for any degree elsewhere.

Student signature



Date: 05/ 09 / 2018

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Date: 5 September 2018

Acknowledgement

In the name of the Father, the Son and the Holy Spirit

Praise be to God almighty, the author and finisher of our faith. The beginning of wisdom is to fear the Lord.

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Dedication

This thesis is dedicated to my parents Dela and Sithembile Madide as well as to my Aunts Nompumelelo Gumede and Sibongile Mlotshwa.

Abstract

Traditionally, education in South Africa has tended to be direct instruction or commonly associated as rote learning which puts the teacher at the centre of the teaching and learning. Post 1994, the education policy in South Africa began to consider the introduction of the concept of learner- centred teaching strategies in our curriculum with the emphasis on the learners as the centre of learning. There has also been over emphasis on the importance of mathematics performance or underperformance, which compels that teachers change their teaching strategies. This study was conducted in South Africa and focused on the exploration of teaching strategies used in teaching area and perimeter in grade 6. Its objectives were to explore teaching strategies in teaching area and perimeter in grade 6 and to understand the teaching strategies used in teaching area and perimeter in grade 6. The study sought to answer the following research questions: What teaching strategies are used by mathematics teachers in teaching area and perimeter in grade 6? Why do mathematics teachers use these teaching strategies when teaching area and perimeter in grade 6? The study was conducted in schools at Mahlabathini Circuit Management Centre. The study employed a purposive sampling in which three schools were selected. Data was collected and analysed using the observation and semi-structured interviews. Thematic (inductive) analysis was used to analyse data. The findings indicated that teachers do not have sufficient understanding of teaching strategies; their teaching strategies are predominantly teacher- centred; and they do not use modern technology as a teaching strategy. The study recommends that CAPS document and annual teaching plans specify teaching strategies to be used and be monitored; curriculum developers broaden the scope regarding area and perimeter: mathematics documents be reviewed to include guidelines on how teaching strategies should be used in line with the content; and teachers be encouraged to enrol for computer courses to acquire knowledge and skills of computers.

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Chapter 1

General overview of the study

1.1 Introduction

This study is an exploration of teaching strategies in teaching area and perimeter in grade 6 at Mahlabathini Circuit Management Centre. This study was conducted in three primary schools and two methods of data generation were used: teacher observation and semi-structured interviews. The study used one participant from each of the three schools. This chapter introduced the study and gave a brief analysis of the problem and rationale for the study and explored the teaching strategies used in teaching area and perimeter. The rationale and the study background were outlined as well as the research questions and aims of the research. The motivation factors behind this study emanated from the personal and social interest of mathematics teachers and the research also reviewed the literature on studies conducted previously by other researchers. The experiences in teaching mathematics and knowledge-sharing forums with other teachers were crucial in arousing the interest of this study. From these interactions, I discovered that most teachers are still using one teaching strategy when teaching area and perimeter, which is direct instruction (teacher- centred). This strategy is presumed to be depriving learners the opportunity to co-operative and constructive learning. It considers learners as passive participants in the teaching and learning process.

When we think of teaching, we usually encounter enormous complications, contradictions and anxieties. The work of a teacher outlines the life of his or her classroom daily. In addition to reacting to the learners' needs within the classroom, a teacher is presumed to be implementing endless transformations advocated by politicians, researchers and classroom-administrators (Dana & Yendol-Hoppey, 2014, p. 1). One of the biggest challenges teachers encounter is to determine the best effective teaching strategies for their learners. Comprehending and evaluating involvement of learners in learning can assist teachers design the best curriculum and ascertain how learners effectively learn (Tsay & Brady, 2012).

1.2 Problem statement

There has been an outcry in South Africa regarding the results of mathematics from primary schools and secondary schools. Despite the Education Department's attempts to raise the quality of education in South Africa, learners' performance continues to fall. Society has been affected by the poor performance of learners in mathematics. Many learners have opted for mathematical literacy instead of mathematics science in the secondary phase of schooling. This affects the country in terms of shortages of skilled workers like engineers and doctors; consequently, forcing the country to import such skills from other countries. The aforementioned challenges do not only force the Education Department but also businesses and other stakeholders to import skilled workers from other countries. Should the study be conducted successfully the society may benefit greatly. It is every country's wish that its students contribute to the society and be aware of society values (Van den Akker et al., 2009). Mathematics performance in South Africa has not been pleasing and results have been poor. There are various factors which contribute to this including teachers' knowledge of content, management of time, commitment of parents to the education of their children, inspiration and interest and strategies of teaching (Graven, 2014).

1.3 Rationale

Mullis, Martin, Gonzalez, and Chrostowski (2004) advocated that in South Africa the poor results of mathematics have been in existence for some years and to identify the problems causing poor performance, the country has embarked on several evaluative and comparative studies that were conducted at national, continental and international levels. South Africa is facing a crisis in mathematics education (Modisaotsile, 2012). This is evident in the Third International Mathematics and Science Study as South Africa was placed amongst the underperforming countries. In an effort to better the mathematics performance, the Department in 2008 introduced a new assessment strategy in grade 6. This strategy was called Annual National Assessment (ANA) which intended to track the performance of learners in grades 3, 6 and 9. The Department indicated that ANA results would be utilised in the monitoring of learner progress, give guidance to teachers' planning and distribute resources to improve the language, knowledge and skills of learners in mathematics in the grade concerned. For example, the Annual National Assessment grade 6 in 2012 and 2013 learners performed below average in mathematics. I am of the view that emphasis should be put on employing effective teaching

strategies to improve performance. For this reason, I have developed personal interest in conducting the study on teaching strategies. Broadbent and Poon (2015) advocated that aligning the teaching strategies with the learning styles of learners enhances their academic performance and that mechanisms should be put in place to identify the most appropriate teaching strategies. Freeman et al. (2014) argued that teachers should comprehend their teaching strategies and find out to what extent they influence learner performance. As a mathematics teacher for eight years, I have been met with poor performance in mathematics on the part of learners. I believe that one way of improving learners' performance in mathematics is to explore teaching strategies used by mathematics teachers. Through my expertise in teaching mathematics, this poor performance trend may be reduced. My participation in various mathematics roles at School, Cluster, Circuit levels led me to realise that teaching strategies need to be clarified and reviewed. I have also realised that there is a correlation between teaching strategies used and learner performance (Guirguis & Pankowski, 2017). I have been involved in mathematics related roles at school and circuit levels. Being a cluster coordinator for mathematics, I have observed that at times, teachers are not sure of their teaching strategies in mathematics. There is a possibility that in addition to content in mathematics, attention to teaching strategies may improve the performance of learners in mathematics (Resnick et al., 2016). This study has the potential to contribute and strengthen teaching of mathematics, in particular, area and perimeter.

1.4 Research aims/ objectives of the study

- To explore teaching strategies in teaching area and perimeter in grade 6.
- To understand the teaching strategies used in teaching area and perimeter in grade 6.

1.5 Research questions

- What teaching strategies are used by mathematics teachers in teaching area and perimeter in grade 6?
- Why do mathematics teachers use these teaching strategies when teaching area and perimeter in grade 6?

1.6 Location of the study

The study was done at Mahlabathini Circuit in Zululand district. The schools are located in kwaCeza, a semi-rural area North of KwaZulu- Natal near Ulundi. This place is a mixture of rural and semi-rural population with low socio-economic status. They are no fee-paying schools, which enrolled approximately 700, 800 and 600 learners (only African). To ensure that learners have at least one meal a day, a feeding scheme was in place. Although located in a semi-rural area, the schools were considered as better schools in the area. Educators in the school were from the local and surrounding places of Ulundi and Vryheid. They stayed in school cottages and others were renting places near the school. The language that was spoken was IsiZulu. Many learners came from very disadvantaged families, where parents are mostly teenagers attending the secondary school, therefore children are left to be taken care of by the grandparents. The lack of basic infrastructure such as roads and electricity in some places, has had a negative influence on the learners' attendance at some point.

1.7 Methodology

This study was qualitative in nature. Qualitative research focuses on human activities holistically with an attempt to locate the actions of individuals in their cultural contexts (Maree, 2007). It includes divergent orientations and approaches to different cognitive and disciplinary traditions based, frequently in various theoretical assumptions. New data-gathering and analysis techniques are generated by all these divergent orientations, approaches and assumptions (Walsh & Downe, 2006). The study employed a case study and an interpretive paradigm. Qualitative research is strongly linked with the interpretivist paradigm (Walsh & Downe, 2006). The study employed the interpretivist paradigm because its position was to perceive knowledge to be formulated and therefore unstable or biased (Walsh & Downe, 2006). This study employed observation and semi-structured interviews. Observation was utilised to assist the researcher to acquire sufficient data and better understanding of the observed phenomenon while the interviews give the opportunity to view the world through the participant eyes, which are a valuable method of data collection if used effectively (Maree, 2007). This study employed purposive sampling. According to Kelley, Clark, Brown, and Sitzia (2003) purposive sampling simply means the selection of participants based on some defining characteristics of a population and the purpose of the study. Ethical considerations were of paramount importance, especially because the

research involved human beings. The ethics required were carefully adhered to. Ethical clearance was issued by the University of KwaZulu -Natal (see-attached appendix) to proceed with this study. The district managers, circuits managers and school principal granted the researcher permission to conduct research. Participants participated voluntarily in the study and they were informed that they can withdraw from participating in the study at any time.

1.8 Outline of chapters

Chapter 1 introduced the research study. It highlighted the problem statement, rationale, research aims/ objectives of the study, research questions, location of the study, methodology, data collection and data analysis, sampling and ethical consideration.

Chapter 2 focused on the review of literature concerning the study. The chapter sought to explore the teaching strategies used in teaching mathematics in general, but area and perimeter in particular. It also clarified the teacher and learner- centred teaching strategies.

Chapter 3 contained the approaches to research, paradigm, context and location, case study, methods of data collection, sampling, ethical issues, limitations of the study, data analysis and research instruments.

Chapter 4 discussed the findings which answered the research questions and provided a summary of the findings thematically.

Chapter 5 discussed the findings and provided the recommendations based on the data collected and literature reviewed.

1.12 Conclusion

This chapter has presented the problem statement, rationale, research aims/ objectives of the study, research questions, location of the study, methodology, data collection and data analysis, sampling and ethical consideration. The next chapter focused on the literature review.

Chapter 2

Review of the literature

2.1 Introduction

The purpose of this study was to explore teaching strategies used in teaching area and perimeter in grade 6. In the previous chapter, I outlined the problem statement, rationale, location, and methodology of the study. The study set out to respond to the questions that follow:

- What teaching strategies are used by mathematics teachers in teaching area and perimeter in grade 6?
- Why do mathematics teachers use these teaching strategies in teaching area and perimeter in grade 6?

Teaching strategies are of paramount importance to teachers as they direct teaching. How teaching is transmitted to the learners depends on the teaching strategies used by teachers. The success of teachers in promoting the use of teaching strategies is determined by several factors beyond their jurisdiction. These factors include required textbooks; tests; curriculum, class size and annual teaching plans (Rubin, 2013).

In this chapter, I presented the literature relevant to teaching strategies. In the next section, I discussed very briefly the concept of curriculum.

2.2 Explanation of curriculum

It is imperative to consider the history of education in South Africa when one wishes to discuss the curriculum in the South African context. Between 1989 and 1994 South Africa began effecting radical changes in education (Booyse & Du Plessis, 2008, p. 12). Education prior to 1994 was characterised by segregation and racial inequalities; hence it had to undergo fundamental transformation with the inception of the new democratic dispensation (Palmer & De Klerk, 2012). According to Booyse & Du Plessis (2008, p. 12) the introduction of Curriculum 2005 (C2005) and Revised National Curriculum Statement (RNCS) were underpinned by the adoption of Outcomes Based Education (OBE). These transformations have led to the

Curriculum used in South Africa today, which is Curriculum and Assessment Policy Statement (CAPS).

The disagreement about the explanation and interpretation of the curriculum has existed for quite some time. Stenhouse, in 1975 noticed the different perspectives of the curriculum facing the teacher. Curriculum is viewed as an intention, scheme or prescription, a desire of what one wishes to take place in schools. Curriculum on the other hand is viewed as the existing state of affairs in schools, what really is taking place. When we seek to comprehend the meaning of curriculum, we encounter divergent responses according to the view of the respondent, context and experience. Generally different explanations are accepted based on what is considered and not considered in the description of curriculum. Eisner (1985, p. 106) defined curriculum as a series of designed occurrences that are deliberated to have educational results for one or more learners. Fraser (1993) viewed the curriculum as the connected entirety of aims, learning content, assessment procedures, teacher and learning activities, opportunities and experiences that guide and implement activities in a sensible manner.

These views have influenced curriculum change in South Africa. Educational transformation has been affected by the crucial changes in politics which took place in the country during the 1990s which abolished the apartheid government and introduced a democratic government in South Africa. South Africa has embarked on radical education reform and there has been continuous change since 1997 in curriculum policy system when the first one was introduced (Adu & Ngibe, 2014). In 1997 Curriculum 2005 (C2005) was introduced, in 2002, Revised National Curriculum Statement (RNCS), in 2007 National Curriculum Statement (NCS) and currently Curriculum and Assessment Policy Statements (CAPS) which was introduced in 2012. This indicated that the policy statements and curriculum are continuously revisited. Adu and Ngibe (2014) explained the effects of transformation in the curriculum on the teachers' lives, relationships and working patterns and education experiences of learners. It has an influence on parents by amending the education which their learners acquire thereby affirming or disputing their own presumption of what school should be like. It influences the society at large, which looks and monitors what transpires in schools involving learners' attitude and conduct and also influences managers who

view the curriculum from a rough and ready measurement of how the capabilities and talents of the male and female learners they employ suit their needs.

The definition of curriculum suggests that we need to look at the curriculum design such as documents which consist of a written plan of what, how and why a certain content should be taught when we need to study curriculum. This defines curriculum as a course of study or schedule of study. According to Nepi and Pacini (1993) curriculum refers to the activities which comprise teaching and learning and practices which are offered by the school. The definition takes into consideration aims and objectives, choosing the content that would be taught, teaching strategies and strategies of assessment. My study explored teaching strategies used by mathematics teachers to teach area and perimeter. Therefore, in this study, teaching strategies were seen as a form of curriculum. Curriculum development was seen, among other things, as a series of classroom activities such as teaching (Hewitt, 2006, p. 82).

2.3 Background of Mathematics

Mathematics refers to the language that utilises systems of symbols to numerically and graphically describe relationships. It is an activity of humans which involves observing, representing and exploring models and quantitative relationships physically and socially and linking mathematical objects themselves (Education, 2011). It assists in developing mental processes that supplement logical and analytical thinking, correctness and solving of problems that will contribute to making decisions (Education, 2011).

The question that should be raised is: how did the ideology of apartheid and practice of politics affect the teaching and learning of mathematics? South Africa is a country where the disparities in mathematics education represent a history of unjust social arrangements (Khuzwayo, 2005). The 1954 Bantu Education Act formally legalized racially segregated educational facilities for all South Africans. This Act based education on the concepts of separate development; a separate 'Bantu society' and separate 'Bantu economy' for which both black learners and black teachers were to be prepared (Khuzwayo, 2005). Mathematics education in South Africa for blacks has never been good. The then minister of Native Affairs, Dr HF Verwoerd delivered a speech on 17 September 1953 when reading the Bantu Education Bill, where he said:

When I have control over native education, I will reform it so that the Natives will be taught from childhood to realise that equality with Europeans is not for them. People who believe in equality are not desirable teachers for natives... what is the use of teaching the Bantu child mathematics when it cannot use it in practice? (Verwoerd 1954, p. 3585).

Verwoerd's policies were discriminating and discouraging blacks from taking mathematics as a subject and many black students could not take mathematics as a subject through the end of their high school studies since a number of schools did not offer mathematics at the senior secondary level (Khuzwayo, 2005).

Mathematics education has faced difficulties over the past years up to this day. The quality of mathematics teaching and learning has been questionable across South Africa. It seems obvious that access to mathematics was restricted for blacks and reserved only for the whites (Graven, 2014). Christie and Collins (1982) highlighted that white people were not ill-treating black people purely because they are racial bigots (which they may be) but because they needed them not to be competitive and to be cheap labour. The Curriculum and Assessment Policy Statement (CAPS) which was recently implemented and the Annual National Assessments (ANAs) for grade 1 to grade 6 and grade 9 were introduced to improve numeracy and literacy but the crisis still remains when looking at the ANA results for the past years (Graven, 2014).

2.4 Teaching strategies

Strategy is the term that originated and was used in the military. It refers to the plan of action for implementing a large-scale military operation. Tactics were the precise procedures in implementing the plan. In general, strategy refers to the implementation of methodology to attain learning, and learning tactics are precise steps within the sequence (Schmeck, 2013, p. 5). The Oxford Dictionary defines strategy as the technique of an officer responsible for the country's armed forces, organising and supervision of the large-scale military movements and entire operations of the campaign. Furthermore, it refers to the skill of planning carefully towards a desired goal.

In order to understand the teaching strategies, one has to first understand the word ‘teaching’ and also be able to distinguish between the instructional activities and teaching strategies. Teaching is a broader term referring to everything done by teachers with their learners and curriculum materials (Speer, 2005). Teaching is the act of consolidating understanding covering the distinct knowledge domains, including subject matter, practice of teaching and context (Depaepe, Verschaffel, & Kelchtermans, 2013). Studies conducted previously have not sufficiently distinguished between instructional activities and teaching strategies or little effort has been made in distinguishing between the two. The lack of this distinction has resulted in little attention being paid to teaching strategies. Speer (2005) alluded to the fact that the outcome and effects of instructional activities have been examined previously while the actions (strategies) of teachers using those activities have not been examined. Teaching strategies such as compact monitoring, appropriate pacing, management of classroom as well as clear presentation, well-organised lessons and providing useful information and encouraging feedback have generally indicated to have a favourable impact on the achievement of learners (Klieme & Vieluf, 2009).

According to Speer (2005) teaching strategies are concerned with thinking, judgements and making decisions when preparing for teaching, each involving one or more instructional activities. It includes lesson planning, thinking and making decisions in the process. Teachers’ activities before initiating instructional activities and what they do with them also constitutes teaching practices. For these teaching practices to be effective, they must be utilised by the students. According to Speer (2005) instructional activities are the organised and regular practiced routines which includes students and instructional materials (textbooks, workbooks, chalkboard, charts, overhead projectors etc.) to support student learning of mathematics. These strategies consist of lectures, small groups, problem solving, discussion led by the teacher and individual practices on exercises.

Various factors need to be taken into consideration when seeking knowledge about the teaching strategies. Among other important influences are teachers’ knowledge of subject matter, knowledge of pedagogy and pedagogical content knowledge, curriculum in use, teachers’ goals and contextual factors. Good instruction according to Klieme and Vieluf (2009) is not decided only by the background of a teacher, including views and attitudes; it should be sympathetic to

learners' needs and classroom and background factors of the school. Ernest (1989), stated the three key elements influencing the practices of mathematics: 'influence of the social context, consciousness level of the teacher on his or her own beliefs and the extent to which the teacher reflects on his or her mathematics teaching practice'. These views were supported by Perkkilä (2003) when stating that the influence of factors such as curriculum, assessment practices and the views and values of learning are connected.

There is a correlation between mathematics teachers' practices and teachers' beliefs. It should be noted that teaching does not only include teacher subject matter knowledge in discussing the learning and teaching process but it also includes pedagogical content knowledge (Stipek, Givvin, Salmon, & MacGyvers, 2001). According to Kleickmann et al. (2013) pedagogical content knowledge is described as the understanding or knowledge teachers need so that the subject matter will be accessible to learners. Wilson, Mojica, and Confrey (2013) described pedagogical content domain to be knowledge of content and learners, or knowledge of the techniques learners use to understand a specific mathematical concept and is developed in a teacher's curriculum. Additional to content knowledge, teachers draw upon learners' understanding of mathematical thinking including their knowledge of techniques to use to learners' conceptions in the process of their teaching.

The aim of pedagogical content understanding is to bridge knowledge of content with teaching practices (Brijlall, 2014). Pedagogical content knowledge emphasises the need for teachers' knowledge of the strategies which are likely to benefit learners and reorganising the understanding of learners (Depaepe et al., 2013). Klieme and Vieluf (2009) in the study conducted explained the beliefs regarding the essence of imparting knowledge and learning which includes direct transmission regarding instruction of learning and the constructivist view concerning learning and instruction. These indices are then explained: **Direct transmission view** suggests that the role of a teacher is to impart knowledge clearly and in an organized manner, to explain solutions that are accurate, to give learners clarity and resolvable problems and to make sure there is focus and calm in the classroom. On the other hand **Constructivist view** perceives learners as active participants as opposed to passive recipients during knowledge acquisition (Klieme & Vieluf, 2009). Given the above differences it should be borne in mind that

direct transmission and constructivist approach to teaching do not crowd out each other as it is always believed, but that they may exist together in the production function of education (Bietenbeck, 2011).

It is important that teachers improve their knowledge about teaching to be able to use the teaching strategies that are effective and of benefit to the learners. There are various techniques teachers may use to improve knowledge about their teaching strategies. Among others teachers may personally reflect on their teaching strategies which is about looking back at which strategy has succeeded and which one has not in the classroom and think about how they may transform their teaching strategies to improve learning (Mettetal, 2012). Darling-Hammond (2015, p. 6) stated that the suitability of utilizing certain types of teaching strategies relies on: The essence of the content to be learned, the skills, knowledge and experience that is brought by learners to the situation and evaluations employed to weigh the relativeness to these objectives. To facilitate the process of transmitting knowledge, appropriate teaching strategies that suit particular objectives and outcomes should be applied by teachers (Ganyaupfu, 2013).

2.5 Types of teaching strategies

Several teaching strategies can be used in a teaching and learning situation. In this section, I discussed some teacher-centred and learner-centred strategies to teaching.

2.5.1. Teacher centred

In a teacher-centred teaching approach the teacher transmits knowledge to learners using lectures, textbooks and activities where the teacher specifies each step (Granger et al., 2012). For many years, the traditional teaching strategy or specifically, teacher-centred instruction has been dominant in education. Ahmed (2013) argued that in a traditional classroom, learners tend to be passive meaning that they are recipients of teachers' knowledge and their own learning is not controlled by them. All decisions regarding content to be taught and learned, teaching methods and various forms of assessment are taken by the teacher. Abdi (2014) emphasised that a teacher-centred classroom seems like a one-man show where there is no involvement of learners. Direct and unilateral instruction dominates in traditional classes. Those who follow an approach considered to be traditional believe in the body of knowledge that is fixed and that learners must

know. Duckworth (as cited in Ahmed, 2013) asserted that in teacher-centred learning learners are actually prevented from educational growth. Chen (2014) summarised the main features of teacher-centred learning and instruction:

- Teacher dominates learning process.
- Strategies of instruction are well explained and chosen based on the domain and learning objectives.
- Environment of learning is properly structured and sequenced.
- Goals and objectives are set by the teacher.
- Assessment is aligned to the goals and objectives and conducted at the end of instruction.

The teacher-centred approach adopts what is called a top down approach, which means that learning occurs for the mere fact that knowledge is passed down from the teacher to the learner (Ku, Ho, Hau, & Lai, 2014). Ku et al. (2014) further attested that the direct instruction approach is characterised by three components: demonstration by the teacher, routine practice, and individualistic assessment. The strategy emphasises teaching as the systematic procedure utilizing a cognitive skill; this involves clear instruction which puts much emphasis on the reasons, time, place and techniques of using a particular cognitive skill. They stated that in a teacher-centred and well organized classroom context, learners often learn under supervision and replicated exercises. This is advocated by Tam (2014) when stating that a teacher-centred teaching strategy emphasises what is presented, towards the learning-based model focusing on what learners know and can do. Even activities that learners do in groups do not favour discussion or explore concepts that are involved (Abdi, 2014).

2.5.2. Examples of teacher-centred teaching strategies

2.5.2.1. Lecture method

The approaches to teaching which are considered to be traditional like the lecture method are widely used in education. Khalid and Azeem (2012) argued that the lecture method does not consider learners and their level of understanding. Marmah (2014) defined the lecture method as a teaching method where one person speaks perpetually to a group of learners on a particular subject. It covers the context and learners mindlessly memorise the content. It does not consider

learners in innovative thinking and participation in the creative part of innovative thinking activities. In the process of teaching and learning, instruction often remains unilateral, which becomes an orthodox activity. In the past, most teachers widely used this method to transmit information to the learners as compared to learner centred strategies. In a traditional teacher - centred approach a learner is considered as a learner, who is the passive recipient of information and the role is to provide information or assess learners or monitor the learners to arrive at the correct answers (Zohrabi, Torabi, & Baybourdiani, 2012). The problem is that it prohibited learners from reaching their potential, as attention is paid to pushing the learners to pass the tests instead of catering to the needs of learners. Therefore, the role of a teacher is to create a desired environment which promotes the designated behaviour and prevents those considered to be not desirable (Massouleh & Jooneghani, 2012). In this role the focus is on the teacher. Studies conducted on the lecture method indicated that it is flexible because teachers can adapt themselves to the subject matter, level of achievement of learners, time limit and available resources in a very short period of time (Rahman et al., 2011). Sutherland (1976, p. 31) advocated that the lecture method may motivate, pave the possibility for discussion, display a manner of thought, present in a way intended to move ideas in a way no other strategies are able to do.

2.5.2.2. Learner-centred

Teachers and learners are finding what the research of the past few years has shown, that a world of distinction occurs between rote memorization of facts and concrete comprehension of the concepts underlying reality and processes (Jungst, Wiersema, & Licklider, 2012). True learning occurs at this deeper level of understanding, which is learning that is transferable to the world far from the classroom. The history of learner-centred teaching has its roots in a constructivist theory, where learners learn mostly by active participation and involvement rather than observing (Zohrabi et al., 2012). Learner-centred teaching and learning is an approach that is recommended to current teaching mainly in the Outcome Based Education (OBE). In OBE teachers assumed the role of learning facilitator instead of being traditional lecturers (Laguador, 2014).

Learner- centred teaching is the organization of teaching that focuses on the learners' tasks and activities in the process of learning which considers the interests of learners' needs (Çubukçu, 2012). It is important when planning to teach that various strategies of learning and learners' learning styles be taken into consideration. The learner is at the centre of teaching and learning and has the minimum impact in instruction (Zohrabi et al., 2012). A learner who has the information is more valuable than the one who memorises it. The approach suggests the need for having clarity in understanding learners and their needs so that teachers can provide quality education (Mckenna, 2013).

Active participation of learners in the classroom in today's pedagogy is always encouraged to give strength to the learners' cognitive ability and to the psychomotor domains. The learner-centred approach assumes that learning is entirely determined by learners alone (Massouleh & Jooneghani, 2012). This is advocated by Mckenna (2013) when stating that in the learner-centred approach the focus is on learners' needs, abilities and interests and the teacher becomes a facilitator of the learners' learning. Within the context of culture, community, and experiences learners need to be active participants. Teachers who advocate learner- centred classrooms are strongly influenced by constructivism (a view that learners on their own as individuals construct meaning as they learn (Hein, 1991)), existentialism (an ideology which makes human life a possibility and ensures that all facts and action indicates subjectivity of environment and human) (Sartre & Mairret, 1963)), humanism (is a term relating to an approach which studies the whole person, and the uniqueness of each individual) and progressive philosophies (Çubukçu, 2012). Many studies concerning learner-centeredness encourage the use of this model because it puts the learner in the centre of the learning process.

In a learner-centred approach learners are solving problems, involved in the formulation of questions independently, exploring ideas and communicating their views on debates (Laguador, 2014). According to Doyle (2012, p. 2) teaching in a learner- centred classroom is about making decisions on what learners will learn and, given the teachers' context such as the quantity of learners, time of the day and configuration of the classroom, how will teachers' decisions on instruction optimize the chance for learners to acquire skills and course content? In other words

the activities selected for the class will make it possible for the learners to acquire the skills and course content.

The emphasis on more learner- centred teaching has been the centre of focus in Southern African countries for primary schools (Hardman, Abd-Kadir, & Tibuhinda, 2012). However, a major setback to education practitioners responsible for education reform in developing countries has been how such approach to learning can be implemented given the limited resources, large classes, and inadequately trained teachers (Hardman et al., 2012). To ensure that every learner learns the basic numeracy and literacy skills in their early years of schooling is the most crucial way out of poverty to a life full of possibilities (Akyeampong, Lussier, Pryor, & Westbrook, 2013). In a learner-centred approach, teaching has changed from questions such as: In which way should we teach? With what resources should we teach?” to a perspective where “What would they like to learn? What will they do to learn? What would assist them in their learning” to “How far did they learn? (Çubukçu, 2012). Learning in a learner- centred teaching strategy is different from learning in a teacher- centred teaching strategy in which it is characterised by active involvement of learners (Granger et al., 2012).

Since learning is a process, which involves exploring, conceptualizing, reasoning and utilizing adequate methods to solve problems, teachers ought to realise that it is more effective to make learners perform rather than be encouraged to memorize information (Ganyaupfu, 2013). Learners are believed to be able to formulate a good understanding of a concept when they actively participate in solving problems during learning. Learning emanates from an internal process, it depends on knowledge that learners have already acquired and their abilities and desire to make use of it (Massouleh & Jooneghani, 2012). According to Benson (2012, p. 32) justification of teaching in learner- centred classrooms is that it is pedagogical and leads to learning that is effective for the following reasons:

- i. It adheres to the needs of individuals and preferences.
- ii. It promotes formulation of knowledge.
- iii. It combines learning of language with experience of life.
- iv. It promotes learner participation.
- v. It promotes communication that is authentic.

- vi. It overcomes barriers in the class and outside the class.
- vii. It gives opportunity for discussions, learning styles and preferences.
- viii. It motivates learners in taking responsibility for their learning.
- ix. It discourages the belief that equates learning to being taught.

Research indicates that learners who are taught in a learner- centred paradigm outperform learners who learn from a traditional teacher -centred paradigm (Jungst et al., 2012). Learners in this paradigm participate actively in a class, work collaboratively to achieve a common academic goal and display important problem solving and critical thinking skills (Zain, Rasidi, & Abidin, 2012).

2.5.2.3. Constructivist Theory

Constructivism is the theory which emphasizes giving learners opportunities to judge and interpret situations for themselves based on their previous knowledge and experience (Hussain, 2012). It is grounded in learners' active participation in the process of teaching and learning. Following a constructivist approach to teaching of mathematics in primary schools seems to be more productive in involving learners in activities that promote creativity and innovation. Constructivism theory observes to make judgement on how humans learn (Khalid & Azeem, 2012). Hussain (2012) asserted that the aim of constructivism is to develop skills in learners by giving them activities in their context and disciplines.

It seems a good strategy getting learners ready to take social and professional responsibilities progressively in their future lives. In this approach teachers are presumed to be academic leaders and facilitators of learners. They recognize learners' potential and direct them to a desired destination timeously. Hussain (2012) suggested that constructivism is oriented on knowledge construction making learners do practical work under the supervision of teachers. In the past teachers were assuming an active role in imparting knowledge to passive learners. In the current setting learners are given an opportunity to take an active role in the process of learning by doing activities. Learners are happy and positive when they are actively involved. Constructivists argue that learners are not tabula rasa meaning blank slate but they use their past experiences and cultural factors to formulate or construct new meaning (Khalid & Azeem, 2012).

2.5.3. Examples of Learner-Centred teaching strategies

2.5.3.1. Group work

Group work is one of the most crucial teaching strategies as it assists learners to help each other. According to Cohen and Lotan (2014, p. 2) group work is a strategy where learners work collaboratively in groups so that each learner will have an opportunity to participate in the learning task given. It should be noted that there is a difference between group work and ability grouping, the latter referring to the way learners are divided by academic criteria to instruct the same group. When the teacher gives learners a task to do in groups and allows them to work independently, he or she has delegated authority. Cohen and Lotan (2014, p. 2) advocated that delegation of authority in a task makes learners take accountability for a certain part of their work; learners can choose to finish their task in their own way but are still responsible for final work to the teacher.

The advantage of group work is that the teacher controls the group work by evaluating the final result of a group and the process used by learners to get the final result. In group work, group members are held accountable through a short-written report completed individually after the work in groups. Direct supervision, which is about telling learners their task and how to do it, may be exercised as an alternative in delegating authority to learners. This enables the teacher to monitor the learners to prevent learners from committing errors and to rectify errors as early as possible. Studies conducted on using group work to teach mathematics indicated that group work plays a crucial role with learners because they are afforded an opportunity to ask questions, have discussions, listen, take accountability of the learning content, constructively criticize and create a positive atmosphere for learning mathematics (Koçak, Bozan, & Işık, 2009). In studies conducted in the US, group work was found to be effective in teaching mathematics. More learners exchanged mathematical ideas when they were in small groups. When a task was reasonably well organised, learners cooperated in learning and applied mathematical content (Good, Reys, Grouws, & Mulryan, 1989). Substantial research in the teaching and learning of mathematics shows that using groups for different activities and exercises does lead to constructive and beneficial outcomes for student learning (Sofroniou & Poutos, 2016).

2.5.3.2. Cooperative learning

Cooperative learning is not synonymous with group work because it takes into consideration more than learners' simple learning as a group. Group work means that learners work collaboratively to attain the same objective. It involves two or more learners working together to do a learning task as co-learners, and it includes all types of peer learning (Baines, 2016, p. 10).

To meet the challenges of choosing effective teaching strategies, many teachers use cooperative learning. Cooperative learning is the most widely used type of active pedagogy. Although cooperative learning is considered as the most effective teaching strategy in most subjects, the exploration of this type of teaching strategy in mathematics has been limited (Tsay & Brady, 2012). Cooperative learning is generally defined as team work by learners in small groups to afford every learner the opportunity to participate in collective tasks designed by a teacher (Van Wyk, 2012). Coetzee et al. (2015, p. 108) defined cooperative learning as a group approach where members in a group are interdependent to attain shared goals.

The emphasis is that every group member should take accountability for a certain part of the task, which will positively contribute to the group success. During this strategy, learners assist each other to learn. The success of a group depends on individual members understanding all content taught. This supports the social construction of knowledge. Cooperative learning offers learners learning experiences which are more active and equal learning access. Monyai (2006, p. 127) emphasises that a group ought to be identical regarding gender, literacy and context. Ideally, it should consist of a maximum of five members, but sometimes it may vary depending on the tasks to be done or the problem to be solved.

Killen (2012) viewed cooperative learning as an instructional design that encourages learners' interaction and cooperation during learning. If the afore mentioned elements are not met, it means cooperative learning has not taken place (Teise, 2013). In cooperative learning, the arrangements allow the people to collaborate in order to attain common objectives (Barczi, 2013). There is an interdependence between group members and the team success and it relies on the willingness on the part of learners to cooperate. Support, respect and trust among group

members is of vital importance to achieve shared goals. When using cooperative learning as a teaching strategy, the teachers' role, classroom setting, and learners' roles change.

The teacher's role changes from being transmitter of information to someone who monitors learners in the process of teaching and learning if cooperative learning is effectively adopted and implemented. While the learners work cooperatively, the role of a teacher is to guide and observe learners' work making sure that they make progress (Barczi, 2013). Learners are solving problems, brainstorming, constructing questions independently and are involved in discussions of ideas and debating. Learners can become good leaders if they are given an opportunity to participate in team work, which will enhance their ability to take charge in doing their assignments. Cooperative learning strategy has the potential to offer better opportunities for learners' development and to attain course objectives and learners' goals (Laguador, 2014).

According to Coetzee, et al. (2015, p. 109) the literature suggests many benefits of cooperative learning as a teaching strategy:

- Occasions for changing defective thinking strategies.
- Feedback regarding one's performance.
- Scaffolding that permits learners to participate in a process that is beyond them as individual learners.
- Motivational effects of encouragement and social support.
- Requirements for cooperative interactions among learners, which have also been shown to be conducive to effective learning in general.

If learners work together in groups and assist each other in carrying out tasks we say cooperative learning is being implemented (Monyai 2006, p. 126). Laguador (2014) further stated that cooperative learning provides a desirable situation for every learner and every learner is given equal opportunity, friendship replaces competition, participation and cooperation are enforced, and every learner is entitled to critical and creative thinking. The study conducted by Leikin and Zaslavsky (1999) emphasised the benefits of using cooperative learning as a teaching strategy. Among other things they mentioned that cooperative learning gives the learners the opportunity to explain mathematical ideas and principles to each other, figure out for themselves how to solve problems, and choose the most acceptable or correct answers. Though cooperative learning

is understood to be one of the most effective strategies its critics reveal that its functions are not often understood correctly because the teachers and learners maintained that cooperative learning mainly helps the learners remember information rather than develop a deep understanding of the text they were studying (Thanh, 2011). When implementing cooperative learning, teachers and learners encounter various constraints such as infrastructure, curriculum coverage, duty load and limitation of material (Thanh, 2011).

2.6 Conclusion

This chapter focused on the review of literature on teaching strategies. It focused on teacher-centred, and learner-centred strategies and their examples; explained curriculum, and briefly gave background of mathematics in South Africa. The next chapter focused on the methodology used in conducting the study. Research approach, paradigm, case study, data collection methods, sampling, trustworthiness, ethical issues, limitations of the study and data analysis were described.

Chapter 3

Methodology

3.1. Introduction

This chapter outlined the methodology of the study. Relevant aspects concerning the research design were described. In this chapter, I have described the research approach pertaining to this study, paradigm (ontology and epistemology), context and location of the study, methodology (case study), methods of data generation (observation and semi-structured interview), sampling, trustworthiness and rigour (credibility, transferability, dependability, confirmability), ethical issues, limitations, data analysis and finally the conclusion of the chapter.

At this stage, it was of vital importance to highlight the research questions because all the steps followed sought to answer. The following are the critical research questions:

- a) What teaching strategies are used by mathematics teachers in teaching area and perimeter in grade 6?
- b) Why do mathematics teachers use these teaching strategies when teaching area and perimeter in grade 6?

3.2. Approaches to research

In the social sciences, there are two approaches to research that I am familiar with, quantitative and qualitative research. Ontologically, quantitative research elaborates on only having one truth and a reality that exists independent of human perception. The position of quantitative research ontologically is that there is only one truth, reality exists independent of human perception (Sale, Lohfeld, & Brazil, 2002). According to Yilmaz (2013) qualitative research discusses phenomena numerically using mathematically based methods. The view of quantitative paradigm epistemologically is that the investigator and investigated are not dependent. I have opted not to further discuss the quantitative research since it does not form part of this study. Only qualitative research will be broadened below. Since it is not my intention to seek numerical data, nor to arrive at a truth, I have chosen to conduct my research using the qualitative approach.

3.3. Qualitative research

It is imperative to understand that there is no one, accepted way of conducting qualitative research. There are a range of factors to consider such as: perception concerning the nature of

social reality and what can be known about it (ontology); the research purpose, participants' characteristics, research audience, research funders and the researchers' environment and their position (Ritchie, Lewis, Nicholls, & Ormston, 2013). Researchers emphasise the two ways of which data can be collected, which can be primary or secondary. Secondary data analysis is based on using data that has already been collected by another primary source (Johnston, 2017). Although Johnston (2017) was of the view that secondary data analysis is a sustainable way to utilize in the process of inquiry when following a routine process I opted for primary data analysis for the reasons stated above. This study mostly employed primary data collection because I analysed the original data collected, it was reliable as I could replicate the procedure followed to check the results and the data in this study have been taken directly from the population being studied and it helped me to find information that would answer the research questions. This study employed a qualitative approach because it is exploratory, descriptive and interpretive in nature. I conducted an exploratory research because I wanted to give clarity from ambiguous situations. As the name suggests exploratory research intends on not providing conclusive evidence from which to determine a particular course of action (Zikmund, 2013, p. 52). This study was conducted as a first step, as it was conducted, I expected that additional research will be required to provide more conclusive evidence.

This study was based on Yilmaz (2013) view that qualitative research is an emergent, interpretive and representational approach to the study of human phenomena and social situations in their natural settings. This exploration reveals descriptive ways in which people attach meaning to their experiences of the world. I collected information on the teaching strategies used by teachers when teaching area and perimeter and drew conclusions from what I observed. This study used the text as opposed to the use of numbers and statistics as is the case of a quantitative approach, so it was descriptive in nature. Teachers' activities were investigated in terms of meanings- why people say or act in certain ways. The qualitative approach was a suitable approach for this study as it explored the teachers' teaching strategies in the classroom setting. Little was known about my phenomenon and I wanted to discover more about it (Antwi & Hamza, 2015). The goal of this research was to comprehend the complex world of people's experience and their patterns from the perspective of participants (Krauss, 2005).

The qualitative research view is that the world is made up of people with different purposes, assumptions and beliefs. Thus, to understand the reality of these people is to enquire about it. I observed and interviewed teachers in order to find out what transpired in the classroom. This approach looks at people and events holistically to locate actions of individuals in their cultural context. The epistemological advantage of qualitative research was that it yielded me as the researcher the right to grasp the respondent point of view. I was keen to comprehend the strategies used by teachers and why they are using them, so I opted to use the qualitative research approach. According to de Gialdino (2009) qualitative research is grounded by various philosophical assumptions, orientation and approaches which generate new data gathering and analysis styles. All these different orientations, approaches and assumptions gather new data and analysis strategies.

As this study sought to explore teaching strategies in teaching area and perimeter, qualitative research was suitable as it emphasised the interpretation and provided a researcher with an opportunity to view, look at contexts and an in depth understanding of concepts. Furthermore, qualitative research is about obtaining a true understanding of the social aspects of how teaching occurs and the actions and processes of responding to teaching practices. It can be positively said that qualitative research provides an in-depth understanding of issues, which cannot be understood using quantitative, statistically based investigation.

3.4. Paradigm

Paradigms underpin the theoretical framework so they are of critical importance to researchers (Allan & Philip, 2013). Furthermore, paradigms influence the epistemology, which will consequently influence the choices of methodology and methods. It is imperative that a paradigm be nominated first so that there will be a basis for options regarding methodology, methods and literature. Maree (2007, p. 47) defined paradigm as a particular worldview which addresses important assumptions drawn from people's reality. Researchers are of the view that paradigms represent how we view the world and that our actions in the world occur when we are situating them in those paradigms. There are several paradigms widely used in research which are: the interpretivist paradigm, the positivist paradigm, the post-positivist paradigm and critical theory

to mention just a few. The focus of this study was on the interpretivist paradigm as discussed below.

3.5. Interpretivist paradigm

According to Mack (2010) the interpretivist paradigm is also known as the “anti-positivist paradigm because it was developed as a reaction to positivism.” Sometimes is also referred to as constructivism since it emphasises the ability of the individual to develop meaning (Mack, 2010). The interpretive paradigm was suitable for this study since its purpose was to explore the strategies of teaching used by teachers in teaching area and perimeter in grade 6. This paradigm does not generalise but seeks to understand the phenomenon by generating the in-depth description of what transpires. The study allowed the participants to express their views about teaching strategies they employ in their teaching. These teaching strategies will assist in understanding issues surrounding the teaching of mathematics in grade 6. One of the advantages of employing an interpretive paradigm is that it helps individuals make meaning of the environment where they live.

The interpretive paradigm is not suitable for generalisation. Hence, this study was not about generalisation, but instead about understanding and generating an in-depth description of teaching strategies used by grade 6 teachers. The interpretivist paradigm according to Allan and Philip (2013) perceives meaning being constructed and therefore is not stable or objective, but through engaging people, interacting with their world results in the creation of multiple realities. Interpretive studies seek to understand through the meaning the realities attached to people Maree (2007, p. 59). In this study, I relied on qualitative data collection methods and analysis, which are observation and semi-structured interviews.

Though the interpretivist paradigm abandons scientific procedure, it has the following advantages as stated by Mack (2010): the researcher will produce work similar to other people, it deliberately intervenes in the research setting to attain improvement and seeks to create locally based theories for practice rather than generalisable results. My interpretive research was conducted in a school environment and as a researcher I was more interested in finding a solution

to the research problem rather than attempting to replicate the research in a different context (Allan & Philip, 2013).

3.6. Context and location

The study was conducted at Mahlabathini CMC in Zululand district. The schools are in kwa-Ceza, a semi-rural area North of KwaZulu- Natal near Ulundi. This place is a mixture of a rural and semi-rural population with low socio-economic status. They are no fee schools, which enrolled approximately 700, 800 and 600 respectively and learners were only African. To ensure that learners have at least one meal a day, a feeding scheme was in place. Although located in a semi-rural area, the schools were considered as better schools in the area. Educators in the school were from the local and surrounding places of Ulundi, Vryheid and Newcastle. They stayed in school cottages and others were renting places near the school. The language that was spoken is IsiZulu. Many learners came from very disadvantaged families, where parents are mostly teenagers attending the secondary school, therefore children are left to be taken care of by the grandparents. Due to the lack of basic infrastructure such as roads and electricity in some places, this has had a negative influence on the learners' attendance at some point.

3.7. Methodology: Case study

In this research I used case study. Case study research is important methodology commonly used in education to understand complex educational and social programs. A case study according to Simons (2014, p. 1) documents an event in depth and detail to a specific socio-political context. It can be a person, a classroom, an institution, a program, or a policy. A case study is used mainly to answer the 'how' and 'why' questions and that is why I chose it because it helped me in answering my research questions. If a researcher uses a case study to frame his/her research design it means that he/she is concentrating on a single thing, examining it in detail. Case study assisted me in having a deeper understanding of the dynamics of the situation.

In this research, I concentrated on one thing: teaching strategies used by teachers in teaching area and perimeter in mathematics grade 6 and I looked at it in detail. In doing a case study means, interest in something specific. In this research, I was interested in understanding how and why teachers in grade 6 are using these teaching strategies. Therefore, it can be assumed that you get

closer to the why and the how questions in a case study if you do a study of one case, looking at your subject from many different angles. A case study was a suitable methodology as it allowed me as a researcher to look at my subject from many varied angles and to get closer to the why and how questions. Furthermore, case study allowed this study to explore particular teaching strategies used in teaching area and perimeter and to drill down further.

3.8. Methods of Data collection

3.8.1. Observation

Being alive makes us observers of our everyday world and our behavior in it. What we learn assists us make meaning of our world and guides actions we will take in future. Merriam and Tisdell (2015, p. 137) highlighted that observation firstly occurs in a setting where the phenomenon of interest is located and secondly, data generated from observations represents the first hand encounter of a phenomenon. I was a non-participant in the study and I tried to be as unobtrusive as possible. In non-participant observation or direct observation, the researcher is watching rather than taking part, therefore, technology is often used to collect the data (Eriksson & Kovalainen, 2015, p. 100).

In this study technology devices, such as videotapes and taking photographs were employed. The advantages of using direct observation is that I was able to revisit the observation several times (e.g. on videotapes, or photographs), I observed occurrences that had become routine to the participants themselves, in a way that led to understanding their context. Eriksson and Kovalainen (2015, p. 100) further highlighted a distinct advantage of observation; it is that it records action as it takes place. Direct observations focus on more specific issues as compared to participant observation. For this study observation was an important research tool because it is systematic, it also addressed my research question, and was subject to the checks and balances in producing trustworthy results (Merriam & Tisdell, 2015, p. 138).

3.8.2. Semi-structured Interviews

Semi structured interviews were crucial to address my research questions. This method of data collection offered insight into individual experience, which enabled me to explore the teaching

strategies used in teaching area and perimeter. A semi-structured interview is structured to direct certain interconnected topics in the phenomenon of the study, while allowing participants to provide new meanings to the study. Semi-structured interviews have great potential to deal with the difficulty of a research topic (Galletta, 2013, p. 23). Therefore, their purpose is to discover participants' views on their experiences about the research topic. Analytically, the characteristic of semi-structured interviews is to compare responses of participants by item. Data collected are compared, and may be quantified because participants are asked the same questions, in the same way (McIntosh & Morse, 2015).

In conducting the semi-structured interviews to get access to teachers I communicated with the principal regarding the process to be followed. After having discussed the request with the SGB the principal then granted the opportunity to conduct the semi-structured interviews. The interviews were conducted at the participants' classroom after learners were dismissed. Before the start of each individual interview, the researcher and the participants looked at the lessons that were recorded during the lesson observation. There was an opportunity for asking informal questions pertaining to the recorded video. After the viewing of the video, a hard copy comprising of interview questions was given to each participant to go through and indicate when ready for the interview. All the participants gave me permission to conduct the semi-structured interview after school hours in their individual schools.

3.8.3. Data analysis

Qualitative data analysis is about interpreting and classifying visual material with the following objectives: to create a statement about dimensions and development of meaning making in the material and what is contained in it (Flick, 2014, p. 370). Data was collected and analysed using the two qualitative research methods, observation and semi-structured interviews. Thematic analysis was important to use to analyse data because it is the most preferred type of qualitative analysis and it identifies commonalities and contrasts in the data content (Sgier, 2012). In this study, I employed an inductive type of data analysis because in inductive analysis the researcher ignores all previous understandings. From each participant data was collected (observations and semi-structured interviews) and analysed individually. After the analysis of data from each

participant the commonalities, contrast and themes were synthesised together to make meaning of the investigated question (Percy, Kostere, & Kostere, 2015).

In this study, observation sessions were video recorded and photographed to enable me to obtain necessary information to be used in data analysis. All data generated were transcribed and copies given to participants. Interviews were audio recorded and transcribed.

3.9. Sampling

Sampling is central to qualitative research methods, but it has been little discussed compared with data collection and analysis. Generally, sampling involves selecting the portion of the population when doing research. There are different types of sampling used in research namely: random sampling, non- random sampling, convenient/ purposive sampling, and stratified sampling, snowball sampling etc. It was imperative to define sampling at this stage before proceeding further. Robinson (2014) defined sampling as the totality of persons from which cases may be sampled legitimately in an interview study. Theoretical and practical considerations used for qualitative projects influence the sample size. This is supported by Acharya, Prakash, Saxena, and Nigam (2013) when they stated that a sample is a subset of the population, selected to represent a larger population. A sample was taken because I couldn't study the entire population.

The sample of this study from which data was collected were three teachers who teach mathematics in grade 6. Three schools formed part of my population. From these schools one teacher from each school who teaches mathematics grade 6 formed part of the sample in this study. I believed that these teachers have a unique perspective on the phenomenon in question and it was important to include them in the sample. This study employed purposive sampling as some of its characteristics have been highlighted above when choosing the sample. During the process of purposive sampling the three teachers selected disclosed their teaching experience and professional qualifications. The criteria I used to select the sample was based on their experience and professional qualification. These teachers' participation was trusted to provide best information concerning the teaching strategies they are using.

Table 9.1 below shows the profile of the three participants that were used to collect data.

Participant	Years In experience	Subject taught	Grade	Qualification	Gender	Race
Pinky	8	Mathematics	5-6	M + 4	Female	Black
John	9	Mathematics	6	M + 4	Male	Black
James	6	Mathematics	6	M + 4	Male	Black

Barratt, Ferris, and Lenton (2015) advocated that purposive/ convenient sampling depends on researchers' understanding of the area. Purposive sampling is mostly used in qualitative studies. Acharya et al. (2013) advocated that in purposive sampling the sample is selected based on the convenience of the investigator. Selection of respondents depends on whether they are at the right place at the right time or not.

3.10. Trustworthiness

Quantitative research uses numerical methods to establish the validity and reliability of the findings while qualitative research instead substitutes reliability and validity with data trustworthiness (Noble & Smith, 2015). Judging the quality of research in qualitative studies over the years has been intensively debated and until recently there has been less agreement on what makes good and trustworthy qualitative research (Hadi & Closs, 2016). Le Roux (2017) emphasises that the goal of research is to teach and inform, that is, to develop and advance knowledge and thereby make a contribution to society, so issues of trustworthiness are of vital importance. L. Cohen, Manion, and Morrison (2013) stated that trustworthiness involves four components: Credibility, Transferability, Confirmability and Dependability. Elo et al. (2014) elaborated on these components: **Credibility** is about the trust of the qualitative researcher in the verity of the research findings. To ensure that credibility is established, in this study, I ensured that participants are identified and described, sessions were video recorded, photographed and audio recorded. I practically gathered the data through conducting reflective activity, the transcribed data was given to my peers for scrutiny and for the identification of some information that might have been ignored, I used well established research methods that the literature suggests were suitable for the exploring teaching strategies such as observations and

interviews. I formulated techniques in order to encourage participants to respond honestly, (encouraged them to be frank, afforded option for refusal and told them that they have every right to withdraw at any time should they wish to without giving reasons). **Transferability** means that the research findings can be used in other settings in order to ensure transferability. The study findings were constantly compared to one another during the analysis stage of the study in order to establish categories and themes. In order to ensure transferability, I used thick description to show that findings can be shifted to other settings. **Confirmability** refers to the objectivity or neutrality in the research findings. To ensure confirmability, I ensured that findings are only based on the responses of participants and I provided an audit trail. I also used a reflexivity strategy whereby I looked at my context and position to establish how this will affect the research process. To attain reflexivity, I kept and maintained a reflexive journal. **Dependability** means that the data is stable overtime to the extent of being repeated by other researchers. Under different conditions, it would be consistent. To ensure dependability of this research, I used inquiry audit. An outside person reviewed and examined the research process and the data analysis. Authors added the fifth component, which is **authenticity**. Authenticity means that research is genuine or is not copied.

3.11. Ethical issues

According to Dewey (2016, p. 1) ethics is the science that discusses conduct. Honesty must be the fundamental aspect of research, and honesty must be the pillar of the code of ethics (Greenfield, 2016, p. 46). Pimple (2017, p. 1) argued that any research study should be dominated by issues pertaining to ethics. For example, when dealing with human subjects the moral support should be at the highest especially when human lives are directly implicated. It is imperative to adopt ethical principles as a researcher, which consists of policies concerning informed consent, confidentiality, anonymity, privacy and caring (McMillan & Schumacher, 2014).

Ethical issues were considered when conducting this research. An application letter seeking to conduct research in KwaZulu- Natal DoE schools was forwarded to the Head of Department (HOD) and permission was granted (see appendix). Permission letters from gatekeepers (principals) of the three schools, District Manager, CMC Manager, and circuit managers were

obtained. The ethical application form was completed including these attachments and forwarded to the University of KwaZulu- Natal to enable the researcher get ethical clearance. The following was brought to the attention of gatekeepers:

- The school and educators' confidentiality are guaranteed.
- The observation and interview questions may last for approximately 2 hours.
- Under no circumstances should information from teachers be used against the school and data collected will only be utilized for this research purpose.
- No incentive or benefit for participation in this project.
- Data will be stored in a coded computer and shredded after 5 years.
- Participating in this research project is not compulsory; participants can decide not to participate at any time.
- The involvement of teachers in this project is purely for academic purposes only.

3.12. Limitation of the study

In this study, I avoided being subjective and generalising. The study was based on participants' responses, though there was the potential of bias and personal motivation, but it was avoided. There was a possibility of invalidating the findings, for the mere fact that qualitative studies involve a small number of participants. There was a possibility that participants might withdraw at any time from participating in the study, which could have rendered the study unsuccessful. Regarding observation, participants were not comfortable being observed while teaching which almost resulted in not obtaining the best findings. The arrangements with the school were made regarding observation schedules, yet some educators were reluctant to subscribe to those arrangements especially switching periods with other educators to accommodate this research. For the fact that I am a part time student, a small sample limited to three schools in one district was necessary although a greater sample could have been used to generalise the research findings, but time constraints forced the use of a small sample.

3.13. Conclusion

In this chapter, I used a case study as the research methodology and explained the procedure of data collection in qualitative research. I explained the research approach, paradigm, sampling, data collection methods, ethical issues, location of the study, trustworthiness and rigour. The

above-mentioned procedures in qualitative research served the purpose of answering the research questions and fulfilled the objectives of the study.

Chapter 4 Data Analysis

4.1. Introduction

The objectives of the study were to explore the teaching strategies in teaching area and perimeter in grade 6 and to understand the teaching strategies used in teaching area and perimeter in grade 6. Teaching strategies are of vital importance to teachers because to facilitate the process of knowledge transmission appropriate teaching strategies should be applied (Ganyaupfu, 2013). This chapter presented and analysed the data collected in schools from Mahlabathini Circuit Management Centre. The data was collected from three participants teaching mathematics in grade 6. The section focused on was area and perimeter. The analysis was presented in two parts. The first part analysed data from lesson observation and part two analysed data from semi-structured interviews. The data collected from observation consisted of five lessons and semi-structured interviews with the three teachers. The study sought to explore the following research questions:

- (a) What teaching strategies are used by mathematics teachers in teaching area and perimeter in grade 6?
- (b) Why do mathematics teachers use these teaching strategies when teaching area and perimeter in grade 6?

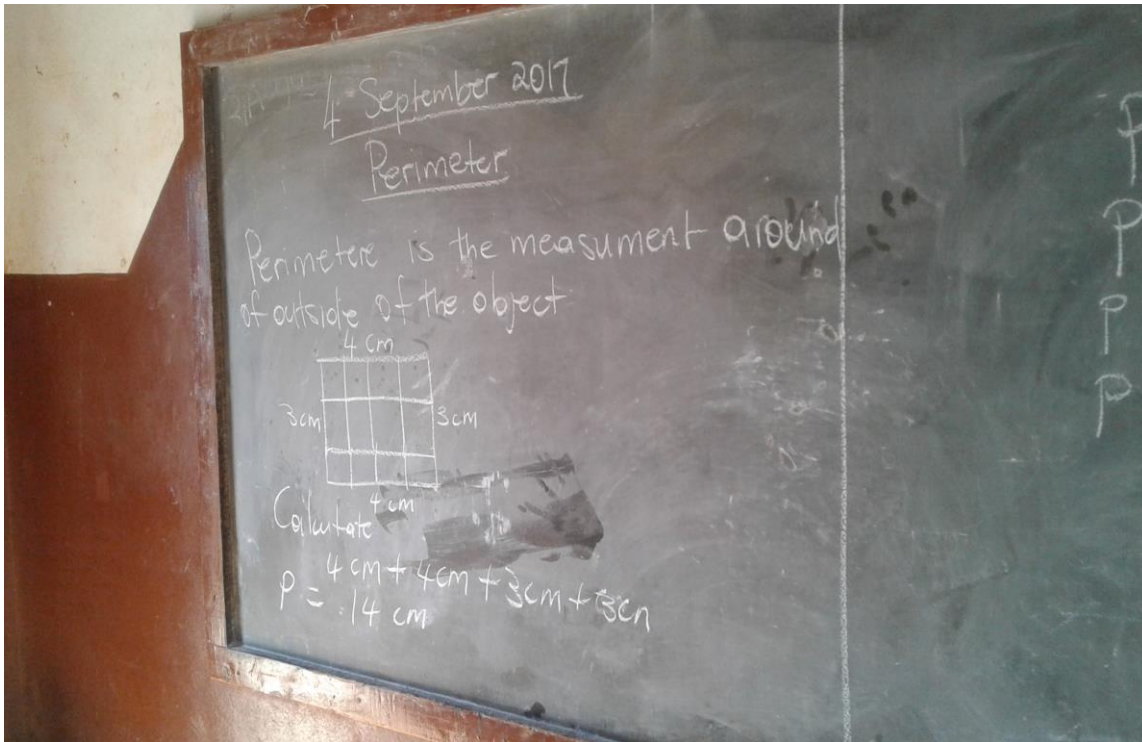
4.2. Data collected during lesson observation

The table below presents the notes written during the lesson observations. After presenting the lesson observation notes, I presented a simple interpretation of the lesson observations noting similarities and differences between teachers and between lessons.

4.2.1. Lesson One

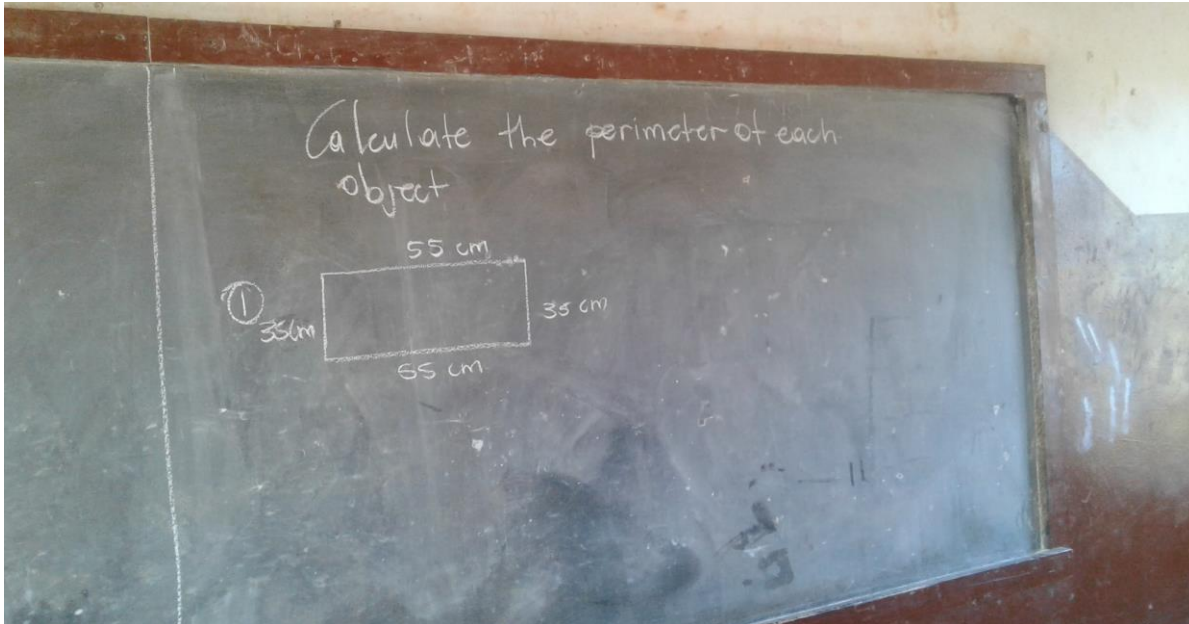
Pinky
Pinky introduced the lesson of the day by first asking the learners what perimeter is. Learners seemed to be unfamiliar with the term. She then explained to the learners the meaning of the term and wrote the meaning on the chalkboard.

Figure 1: Illustrative activity



She gave an illustrative example of shapes or objects e.g. rectangles. She explained what length is and what breadth is with an example on the chalkboard. Learners seemed to be guessing in identifying length and breadth. Units of measurement were used, and learners seemed to be familiar with cm and mm. she taught learners to use a formula when calculating perimeter (of a rectangle). At the end of the lesson she gave learners an informal assessment in the form of classwork.

Figure 2: classwork activity

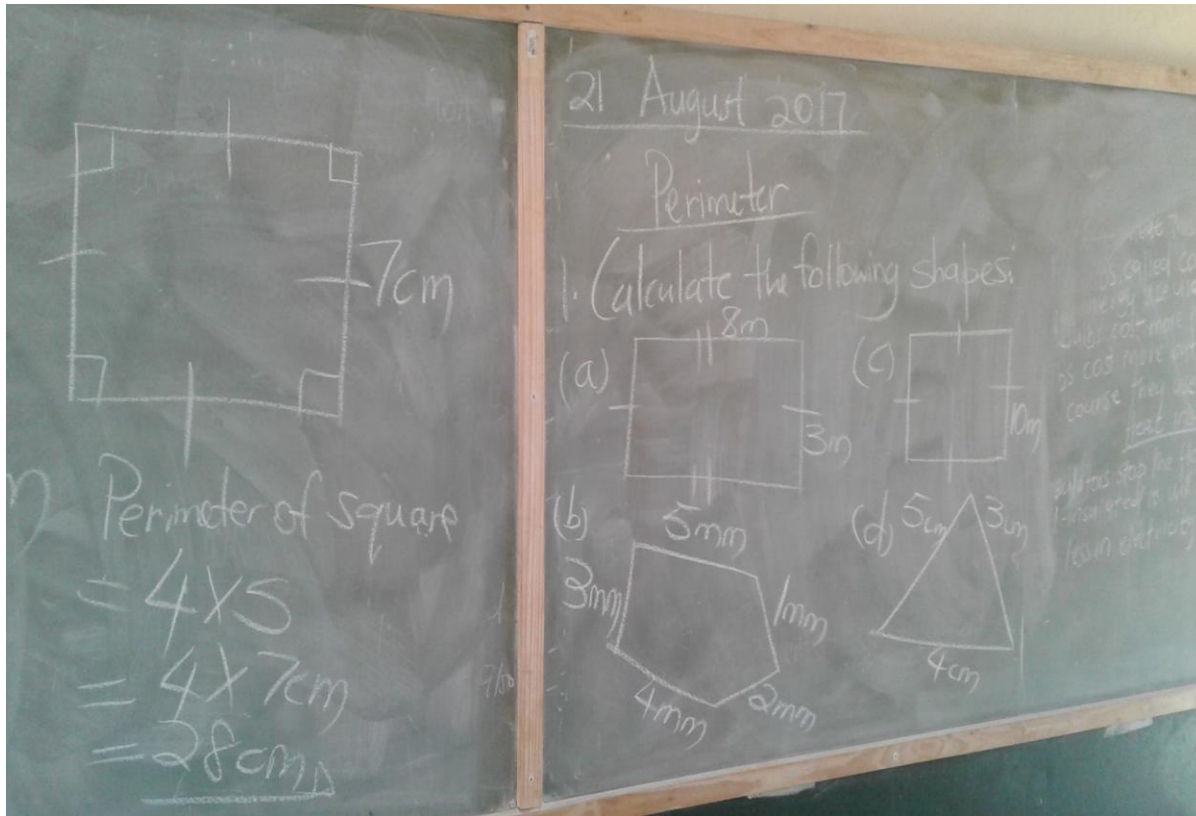


Although learners actively participated by answering questions, the whole lesson was teacher-centred meaning that the teacher was at the centre of the whole lesson and was the sole transmitter of information to the learners.

John

John introduced the lesson by first asking what perimeter is. The learners were unable to answer what perimeter is. He then explained the definition of perimeter. He defined perimeter as to measure the outside length of the shape or polygon. He asked the learners to name the polygons that they know. Learners gave answers such as square, triangle, pentagon, hexagon, octagon etc. he further explained that we need to know the sides of a polygon in order to calculate the perimeter. He gave an illustrative example of calculating perimeter using different polygons.

Figure 3: classwork activity



Learners' participation was very positive in answering the questions. John spent approximately 15 minutes elaborating on those examples. He then gave learners a classwork activity where learners will calculate the perimeter of rectangles. He spent the last minutes of the period to mark and do the corrections on the chalkboard. John was lecturing for the entire period and dictating terms. His teaching was centred to him, hence teacher-centred. The classroom setup also was favouring a teacher-centred strategy because learners were seated in twos in their desks as usual.

James

James introduced the lesson by letting learners open their books on page 37. He explained that this section is in fact a revision from previous grades. He explained that the purpose of doing this section is to measure. He explained the history of measurement that it is not new, in fact our ancestors though they were illiterate, could measure things. For example, they use body parts, shadows etc. James had already prepared the polygons he will teach on the chalkboard. He spent half of the

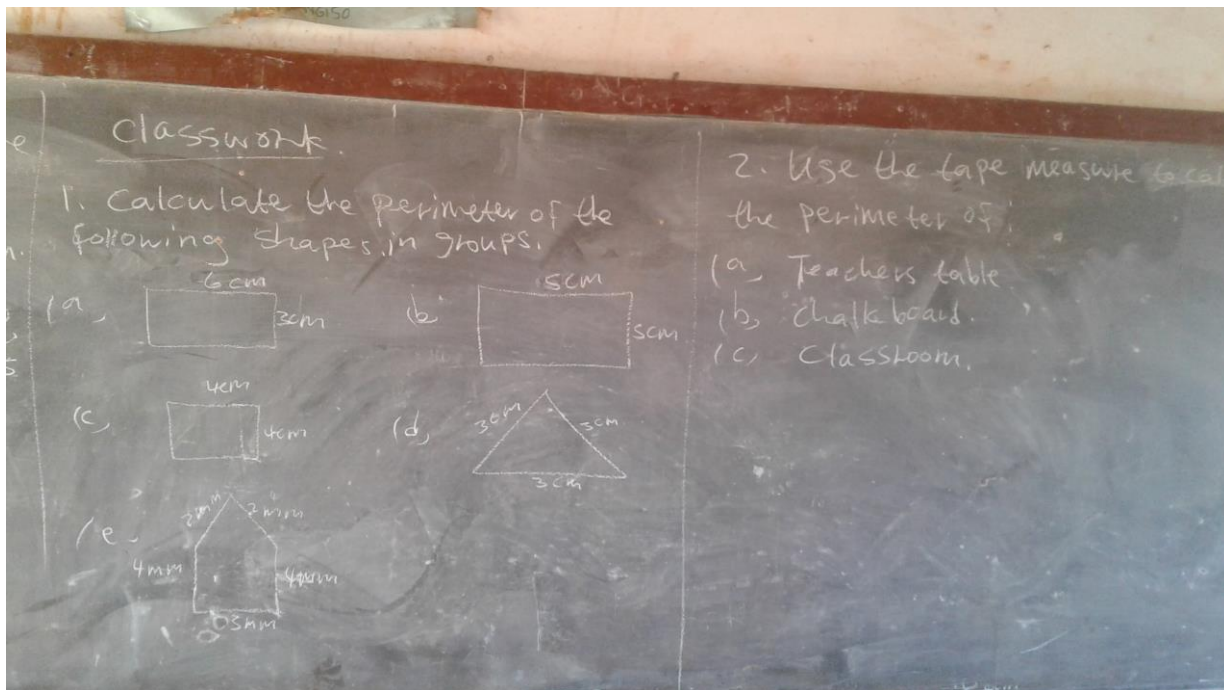
period explaining and asking questions. He used practical measurement to clarify certain parts of the lesson. He spent the remainder of the period giving classwork and marking it. This teaching was a teacher- centred teaching strategy because he was lecturing the entire period and there was no single element of a learner- centred teaching strategy.

4.2.2. Lesson Two

Pinky

Pinky started the second lesson by revising the work done on the day before. She emphasised some of the parts from the day before work. She reminded learners about the properties of 2D shapes explaining how we recognise the sides of the polygon if not given or if only two sides are. She wrote some polygons on the chalkboard and let the learners identify the polygons. She then explained how we derive at the formulas for calculating perimeter.

Figure 4: Classwork activity



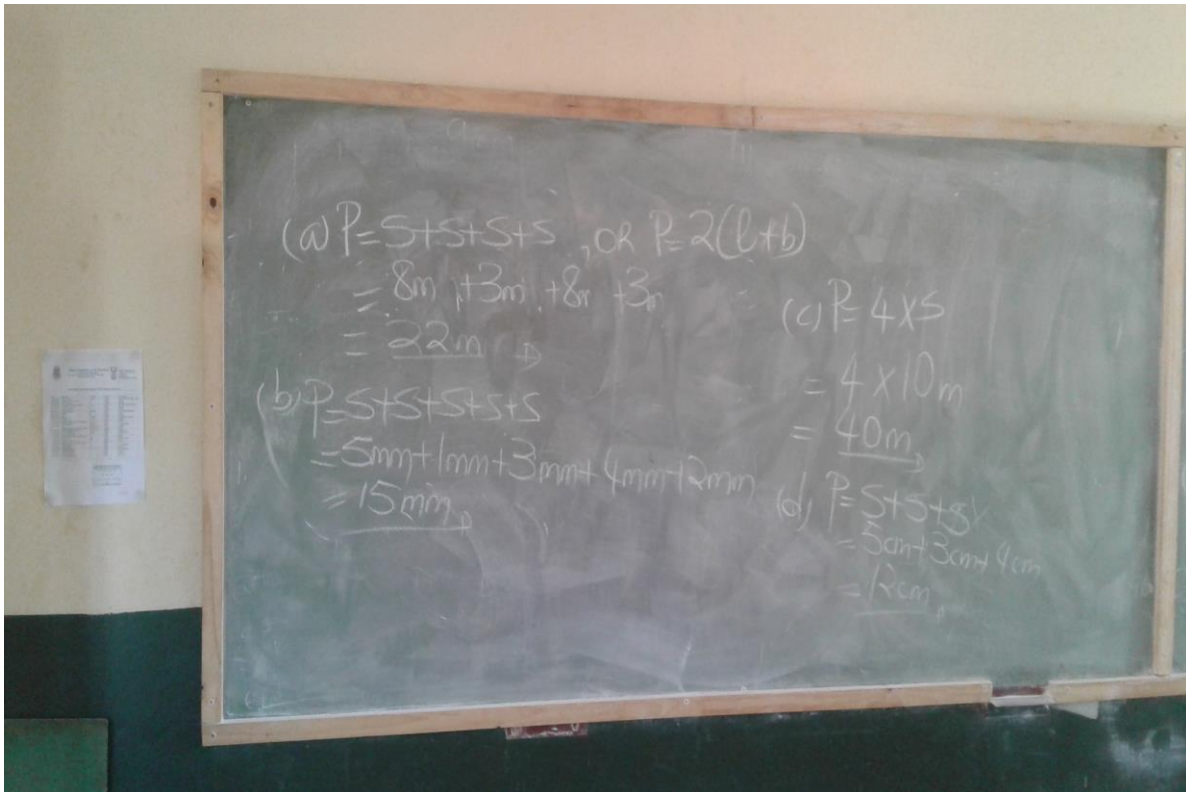
She then gave a classwork activity to learners where they would name the polygon and calculate the perimeter in groups. Pinky moved around to monitor the participation of every member in a group. She spent the remainder of the period marking and allowing learners to do corrections on the chalkboard. The lesson was very exciting for the learners. They participated very well in doing the

activities with peers. The lesson displayed the combination of teacher and learner -centred strategies. Elements of teacher- centred (lecture method) and learner- centred (group or cooperative method) teaching strategies were utilised.

John

John introduced his second lesson by revising the work done the day before. He asked the learners about the measuring instruments when measuring distance. Learners responded very well, they seemed to be familiar with measuring instruments such as ruler, measuring tape and other instruments. He further explained the units of measurements such as cm, mm, m and km. He asked learners which units we should use to measure the length of a classroom, exercise book, table etc. he gave learners a classwork activity where they calculated the perimeter of rectangles.

Figure 5: corrections of the classwork



He spent the remainder of the period marking and doing corrections for the learners and giving them homework. The lesson was entirely teacher- centred because the teacher was lecturing and giving answers where learners had difficulties. Though learners' participation was good, they could

answer the questions and or tasks given but there was no single element of a learner- centred teaching strategy.

James

James on his second lesson re-organised the classroom into groups and had learners sit in groups. He asked the learners what units of measurement we use in measuring the distance or length. Learners discussed the answers in groups such as cm, mm, m and km and responded. He then asked the learners to measure the length and breadth of their exercise books and calculate the perimeter. He gave learners a classwork activity where learners had to calculate the perimeter of different polygons such as rectangles and squares in groups. Learners had the opportunity to help other learners in their groups. They were responsible for doing the corrections on the chalkboard in groups. John verified the corrections for learners. The lesson was learner -centred. Elements of a learner -centred teaching strategy were displayed such as cooperative learning, peer tutoring and practical measurement.

4.2.3. Lesson Three

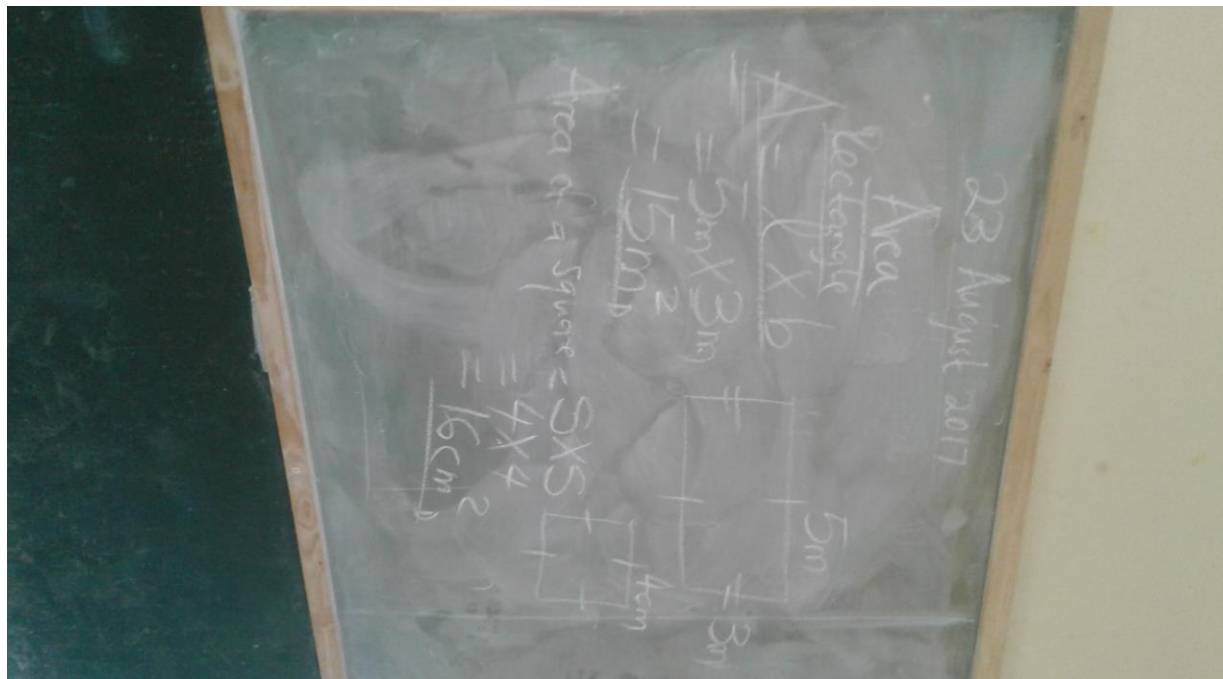
Pinky

Pinky introduced the lesson of the day by asking learners what the area is. Learners responded that area means to measure the surface inside the shape. She elaborated on what area is. She drew a rectangular shape with square units inside (length = 4cm and breadth = 3cm). She taught learners how to use the formulas e.g. $A = l \times l$ for a square and $A = l \times b$ for a rectangle. After doing the illustrative activity, she gave learners a classwork activity where they calculated area of a square and rectangles. She marked the classwork and did the corrections on the chalkboard. The educator was the only source of information. There was no element of learner- centred teaching in her lesson.

John

John taught about conversions. How to convert mm to cm to m etc. He used measuring instruments such as measuring tape and a ruler to teach measurement. Together with learners, they measured the length of windows, chalkboard and classroom and calculated the perimeter. He introduced the area by explaining the formula of a rectangle and square.

Figure 6: illustrative activity



He did an illustrative activity with the learners and after gave the learners classwork which he marked and did the corrections on the chalkboard. John's lesson was both teacher and learner-centred. Elements of teacher and learner-centred teaching strategies were displayed for example practical measuring and lecturing.

James

James revised the work done the day before with learners. He asked learners what perimeter is. He gave a classwork activity where learners calculated area and perimeter of different polygons. He was moving around observing learners. He spent the remainder of the period marking and doing corrections. The entire lesson was teacher-centred. Only the teacher was transmitting information to the learners, there was cooperative learning present.

4.2.4. Lesson Four

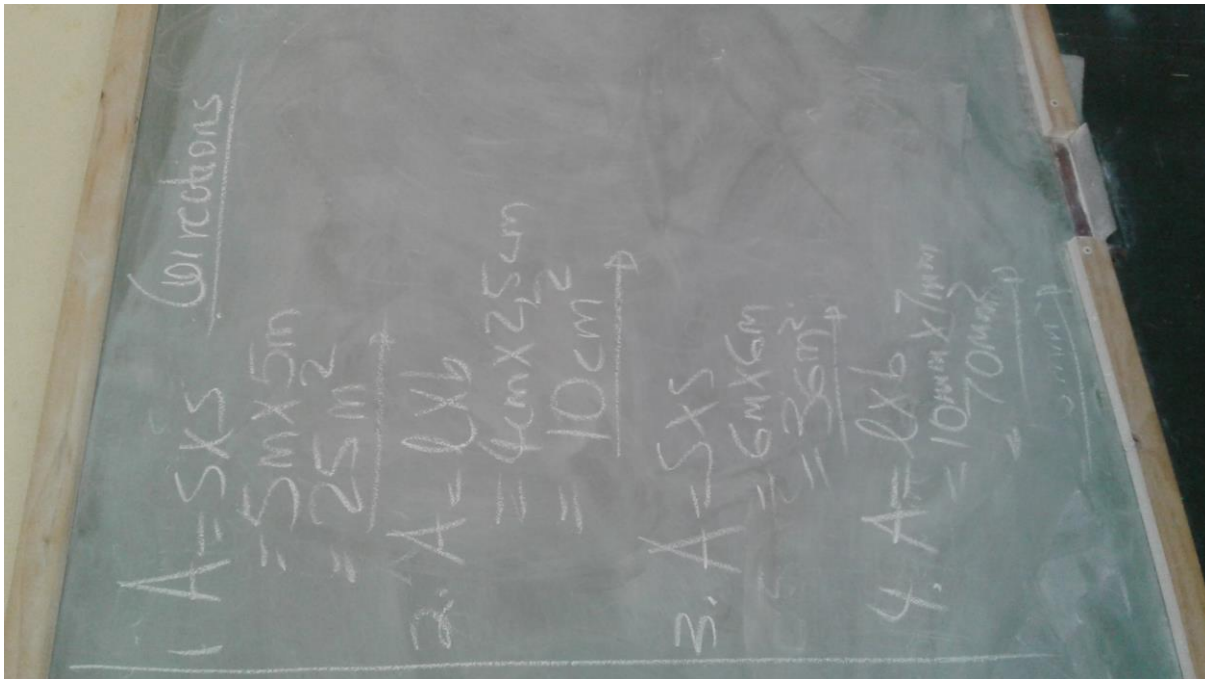
Pinky

Pinky spent the entire period with learners measuring objects in the classroom and outside classroom such as walls, doors, windows etc. Learners worked well in groups when practically measuring the area and perimeter. The participation of learners was positive; learners displayed their high level of understanding. The lesson was learner-centred because learners' cooperation and peer tutoring among the learners were present. The teacher's role changed from being a transmitter of information to a monitor and observer.

John

John revised the work done with learners the day before. He marked the homework. He gave classwork and homework activities covering the content and spent some time in doing corrections.

Figure 7: corrections of classwork



In this lesson, only the teacher was the transmitter of information. Therefore, the lesson was teacher-centred, as there was no single element of a learner-centred strategy.

James

James dedicated the entire period to allow learners to measure in groups the perimeter and area of objects in classroom for example classroom, windows, chalkboard, desks, tables etc. Learners participated well and displayed their level of understanding. The lesson was entirely learner-centred as learners worked well in groups, cooperated well and solved problems on their own.

4.2.5. Lesson Five

Pinky

Pinky's fifth lesson was to write informal assessment tasks covering all the areas taught. She distributed question papers to the learners and they commenced writing.

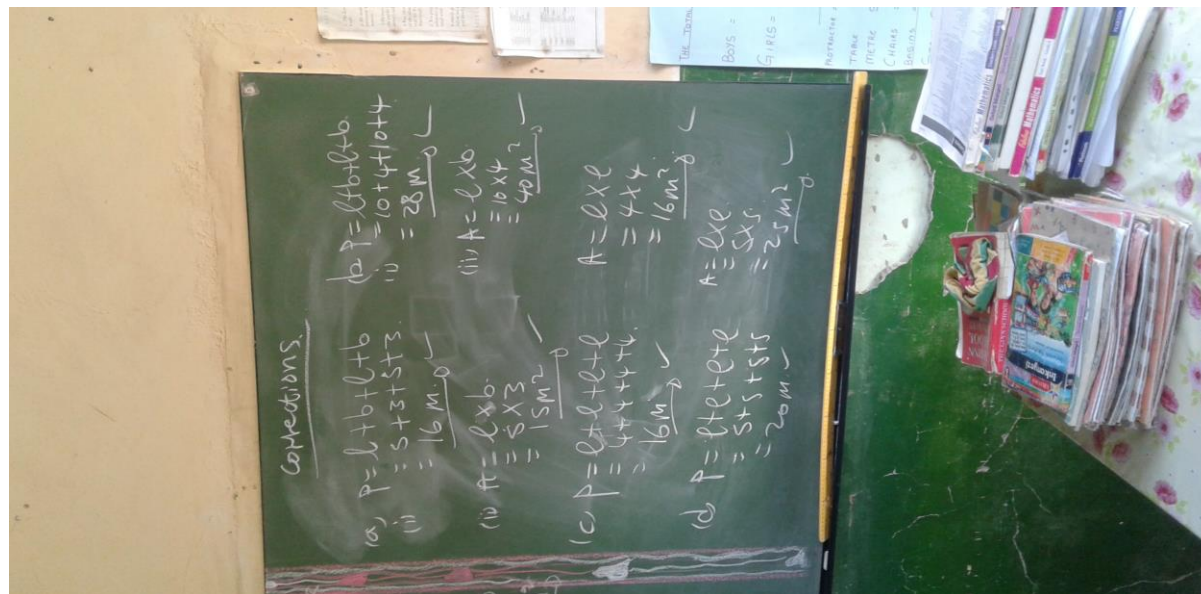
John

In John's assessment programme, this day was for a formal task to be written. He gave question papers to the learners and they wrote the assessment in the form of a test.

James

James revised with learners the entire content taught in preparing for a formal assessment to be written on the following day and doing corrections.

Figure 8: corrections of homework



The lessons presented by Pinky were a combination of both teacher and learner -centred teaching strategies. This can be seen in her first lesson where she was centralising and monopolising the information. However, in the second lesson Pinky used both strategies. She used the direct method (lecture) and gave learners work in groups. There was interaction between the teacher and learners. The third lesson was characterised by teacher- centred (direct instructions) strategies. She was asking questions, elaborating, drawing on the chalkboard doing an illustrative activity, giving and marking classwork and homework. The fourth lesson was entirely learner -centred: learners were mostly involved in practically measuring objects in groups. Learners interacted very well with their peers and they were very responsible. Group members assigned roles to themselves. The fifth lesson was teacher- centred in its entirety because the teacher distributed question papers to the learners and they wrote an assessment task.

John's lessons were predominantly teacher- centred: he used direct instruction when teaching learners. This is evident in his first, second, fourth and fifth lessons where he was lecturing, doing illustrative activities, giving classwork and homework, marking them and doing the corrections. However, learners were active participants in the classroom, but the teacher perceived them as passive recipients of information. The exception was on the third lesson where he involved learners to practically measure objects in the classroom. This lesson presented a combination of both teacher and learner- centred teaching strategies.

James's first lesson was characterised by direct instructions. He was lecturing for most of the period. The entire lesson was teacher- centred. His second lesson was entirely learner -centred. This is evident when he organised learners into groups, asking questions and allowed them to discuss the answers. He assigned roles to group members. Learners did measurement practically helping their peers, doing corrections on the chalkboard. The teacher's role changed from being the transmitter of information into monitor or observer.

4.2.6. Effectiveness of teaching strategies

4.2.6.1. Pinky

Pinky used more of a teacher- centred teaching strategy in her lessons, although elements of learner- centred teaching strategies were displayed. The strategy worked well for her, as she

seemed familiar with this strategy. She displayed knowledge of the subject, and content knowledge. However, I am of the view that if learners had been given more of an active role in the teaching learning process, sufficient and effective knowledge may have been gained. In my opinion, work that is more practical should have been given to learners on a daily basis. Learners at the end were able to accomplish the lesson outcomes.

4.2.6.2. John

John's lessons were predominantly teacher -centred although there were elements of learner - centeredness in his teaching in lesson 3. Learners were actively involved in the lesson but not as active participants rather as passive participants. John possessed the knowledge and skills to teach this content. He seemed comfortable with his methods and is experienced in teaching in this routine and his learners were able to give him the result he expected. The strategy worked well for him and the learners but lacked activities with problem solving.

4.2.6.3. James

Although James's lessons were predominantly, teacher -centred, the lessons were effective, and learners were actively involved in the classroom. In some instances, there was a combination of both teacher and learner- centred strategies. This is evident in the second lesson where learners sat in groups and the teacher was interacting with them.

4.2.7. Teaching resources

4.2.7.1. Pinky

Pinky had sufficient textbooks and although she relied on writing on the chalkboard, some activities were copied straight from the textbook. Learners seemed to comprehend instructions when written on the chalkboard rather than seeing them in the textbook. She lacked measuring resources such as long rulers, measuring tapes and other measuring instruments, but she managed to utilise what she had. Other resources like modern technology (overhead projectors and computers) were not available. It took a long time for the learners to arrive at the answer when doing calculations because only a few learners had calculators and the majority did not have calculators at all, despite the content requiring one. Other learners relied mostly on those who have calculators. In all her lessons learners appeared to be unfamiliar with these resources. For example, they took time to perform the required task.

4.2.7.2 John

John seemed to be relying on teacher-generated activities. It is unclear whether sufficient textbooks and workbooks were available. Not a single activity was taken from the textbook or workbook. Workbooks were not utilised although the teaching plan requires that they be used daily. The availability of calculators was limited. In fact, in my observation not a single learner had a calculator even the teacher himself. He relied on mental calculations. His learners used some basic addition and multiplication operations to arrive at the answer without using a calculator. However, learners were disadvantaged at learning the calculation skills, but this method seemed to be working for them. Measuring instruments such as measuring tapes were available, thanks to other classes. Learners seemed to be familiar and possessed skills of measuring and calculating. There was no modern technology used during my entire observation.

4.2.7.3 James

James had sufficient textbooks, and workbooks. This is evident in his first lesson when he asked learners to open their books on page 37. Most of his activities were taken directly from the textbooks. Not all learners had calculators, but the majority did. Measuring instruments such as measuring tapes were available and adequately utilised by learners. His learners seemed to be familiar with these resources. In most of his lessons, he organised learners in groups so that resources can be equally shared. I did not see any utilisation of technology in his lessons.

4.2.8. Pedagogical content knowledge

4.2.8.1. Pinky

Pinky seemed to be knowledgeable regarding the content taught. She displayed this knowledge when she designed her own activities without referring to the textbook. She used correct terminologies relevant to the content and her lessons were well prepared as per the annual teaching plan. However, her activities lacked problem solving skills and word problems, but she demonstrated the knowledge of the content in question.

4.2.8.2. John

John seemed to be familiar with the content. Though he only has a few years of experience in teaching mathematics, he demonstrated knowledge of measurement. This is evident in his self-

generated activities and using practicals in his teaching. His lessons lacked problem solving activities, word problems and real-life situations.

4.2.8.3. James

James seemed to be knowledgeable regarding the content. He demonstrated his ability in solving problems pertaining to the learners and using resources to overcome barriers to learn. His years of experience seemed to be working for him. He usually over-emphasised and repeated what he has already taught. His sense of humour when teaching assisted learners to interact with him whenever they come across difficulties.

4.3. Data collected during interview

4.3.1. Theme 1: Teacher- Centred strategy vs Learner- Centred strategy

This theme was derived from teachers' responses concerning the strategies they use in teaching Perimeter and Area. The purpose was to find out if there was any significance in the teaching strategies they used and whether there was any commonality about the teaching strategy each teacher used. The following responses were projected:

John: I use both teacher- centred and learner- centred teaching strategies. For example, I lecture, give group work and practical work to the learners.

Similarly, James and Pinky said:

James: The strategies I use in my teaching are lecture method, constructivism, co-operative learning, practicals, group work and many other teaching strategies.

Pinky: The strategies that I use when teaching perimeter and area are lecturing method, co-operative learning, active learning and lecturing.

These three statements indicate that all three teachers interviewed used both teacher and learner- centred teaching strategies. It may suggest that the teachers are flexible and use these different strategies to accommodate different kinds of learners.

4.3.2. Theme 2: Importance of measurement in life

This theme was formulated from responses about what participants thought of measurement as one of the most important content areas in mathematics. Three participants similarly felt that

measurement was not just an important component in mathematics but for life itself. Their responses were as follows:

Pinky: Yes, it is one of the most important areas in mathematics since measurement is part of our daily life and most of the time we measure things or objects such as distance houses etc.

John: Yes, measurement is an important content area because it applies to our daily life. Even if you were not smart in school but possesses basic measurement skills can make one succeed in life. For example, most bricklayers and tilers are not educated but possesses measurement skills.

James: Yes, it is. Measurement applies to almost all the field such as science, education, engineering, construction, farming and many other fields.

Reading the above responses, shows that measurement can be applied across multiple sectors of life, which can further be helpful to individuals as Pinky attested that measurement is part of our daily lives. Thus, we can use it to deal with different encounters in life.

4.3.3. Theme 3: Resources/ classroom environment

This theme was derived from teachers' responses regarding the factors that influence their teaching strategies when teaching Area and Perimeter. These are their responses:

Pinky: The factors influencing teaching of area and perimeter are passiveness, lack of proper teaching resources for example different measuring instruments and size of the classroom.

John: The factors influencing the teaching strategies are classroom environment, teaching resources, pedagogical knowledge and pedagogical content knowledge, learners' background and learners' expertise.

From the above responses of participants, it can be said that teaching resources vary in the teaching and can influence teaching positively or negatively. Most respondents pointed to the fact that the classroom environment was the critical factor. They pointed out that the classroom size is not in favour of learners and it limits learner- centred teaching strategies.

4.3.4. Theme 4: Importance of assessment

This theme was formulated based on the teachers' responses on how they ensure that the learners have understood the lesson. Their responses pointed to assessment as the basic tool for ensuring that the lesson was in fact understood or not.

Pinky: For me to know that learners have understood the lesson, I ask questions concerning the content taught and give them classwork and homework. If their participation is not satisfactory, I conclude that they did not understand the lesson.

John: I give them variety of assessment and observe how they respond to those assessment techniques.

James: If they respond positively that is if they get the answers correctly it means they understood the lesson.

According to teachers' responses, assessment is a yardstick of measuring the achievement of objectives.

4.3.5. Theme 5: Subject matter knowledge, pedagogical knowledge and pedagogical content knowledge.

When teachers were asked if they think the teacher subject matter knowledge, pedagogical knowledge, pedagogical content knowledge has an influence in their teaching of area and perimeter, their responses were as follows:

Pinky: Yes, they have an influence in the teaching because without subject knowledge and content knowledge teachers would not be able to teach the content effectively. In other words, without these knowledges effective teaching would not take place.

John: Yes, they have an influence because the teacher need to be knowledgeable about the subject he/she teaches should possess or acquire pedagogical and pedagogical content knowledge of teaching area and perimeter because they influence the teaching.

James: Yes, they have an influence. It is important that a mathematics teacher knows the subject he or she teaches, its content and should possess mathematical skills.

From the above responses of participants, knowledge of subject, content and pedagogical knowledge are of critical importance in the teaching of mathematics.

4.4. Conclusion

This chapter provided an analysis of the data collected through observation of lessons and semi-structured interviews. I started by analysing the observation of lessons and then the semi-structured interviews. I used a deductive approach, which allowed me to formulate themes based on the data collected. I then discussed these themes from what transpired from the data collected. The next and final chapter focused on the findings and interpretation of findings and recommendations.

Chapter 5

Interpretation of findings and recommendations

5.1. Introduction

The study explored the teaching strategies used in teaching area and perimeter in grade 6. It attempted to identify the strategies that mathematics teachers use in teaching area and perimeter. Data generated was analysed in the previous chapter. In this chapter, the researcher discussed and interpreted the findings from lesson observations and interviews. To determine whether the research questions have been answered, they were re-visited in this chapter.

5.2. Teacher- Centred teaching strategy vs Learner -Centred teaching strategy

The findings in this study revealed that teachers have insufficient understanding of the teaching strategies. They seemed to be unaware of the approach to teaching and teaching strategies. Their teaching strategies are mostly teacher- centred because the teacher is at the centre of the teaching and learning process. However, their teaching included elements of learner- centeredness, but the drivers of the learning process were the teachers themselves. During the lesson observations, teachers only used group discussion and practical work as the learner- centred teaching strategies. During the semi-structured interviews, teachers mentioned various types of teaching strategies they claimed to be using but in actual lesson observation, most of those strategies were not found.

It is recommended that teachers educate themselves about the learner- centred strategies and how they can utilise them to the advantage of themselves and learners. The findings also indicated that teachers do not use technology as a modern-day teaching strategy though they have indicated during interviews that they use technology as a teaching strategy. Teachers maintained that teaching strategies are a crucial element in teaching. The findings revealed that most teachers do not pay attention to Bloom's Taxonomy when doing assessments. Most of the activities given are in the low and middle order. During my entire observation, there was no evidence of word problems and problem-solving activities. The findings revealed that assessment strategies used were not up to the standard expected by the Curriculum and Assessment Policy Statement (CAPS).

5.3. Teachers' subject matter knowledge, pedagogical knowledge and pedagogical content knowledge.

All three teachers observed and interviewed are qualified teachers with a reasonable number of years in teaching mathematics. All teachers attested to the importance of teacher subject matter knowledge, pedagogical knowledge and pedagogical content knowledge. Although teachers demonstrated knowledge of the content and the subject, they lacked pedagogical knowledge. Most of the teachers were unable to demonstrate their pedagogical knowledge. The qualities and skills including teaching techniques were in short supply. During lesson observations, teachers rarely used real- life problems in their classwork and homework activities. This study revealed that teachers struggle with using appropriate teaching strategies that are relevant to the topic. The findings of this study highlighted that teachers have little understanding of the teaching strategies they used. In fact, they think teaching strategies occur automatically in the teaching process.

5.4. Teacher development programmes

The findings revealed the lack of teaching strategy development in teacher workshops regarding teaching strategies specifically. Although teachers are familiar with the content but they seem to struggle with the strategy of transmitting information to the learners. The findings revealed that most participants had scarce resources relevant for teaching area and perimeter, so learners had no option but to share those resources.

5.5. Research findings

It is imperative for any teacher teaching measurement to be as practical as possible because measurement has to do with real life situations. In grade 6, teachers should always emphasise practical work when it comes to measurement because it is where learners demonstrate their measuring knowledge and skills. Learners should be given an opportunity to work independently and engage with each other. Teachers need to be creative when choosing the strategy to be used. The Department of Education does not prescribe the teaching strategies to be used as it is the teachers' choice which teaching strategy to be used. The following findings emanate from comparison of lesson observations and interviews.

5.6. Knowledge of teaching strategies

When teachers were asked what teaching strategies are, all of them indicated that teaching strategies refer to methods or teaching styles used by the teacher to deliver the information to the learners. The findings revealed that teachers have knowledge of teaching strategies. When asked what constitutes teaching strategies most teachers indicated that it is constituted by teacher-centred and learner-centred teaching strategies such as co-operative learning, utilising technology, active learning, enquiry based learning, lecturing, group work and constructive learning are part of it. Teachers have substantial knowledge of what constitutes teaching strategies. When comparing the lesson observation and interviews, it was found that teachers have limited understanding of how to implement these teaching strategies. They end up using the one strategy, which is direct instruction (teacher-centred).

Though they tried to incorporate learner-centred teaching strategies, their choices of strategy failed. For example, teachers would let learners sit in groups with the hope that they are using a learner-centred teaching strategy but find that they are still using direct teaching with little or no evidence of co-operative learning. Most participants claimed that they are using a particular teaching strategy while actually they are not. In other words, there was no integration in what they said during interviews and what they did during lesson observations. When the participants were asked why they use these teaching strategies they indicated that they want to accommodate every learner to achieve and gain knowledge and that these strategies are used in the education systems.

5.7. Challenges encountered in teaching area and perimeter

During my observation, participants had different challenges. Among other challenges was the issue of progressed learners who seem to struggle to understand the lesson. Classroom size, lack of proper teaching resources, pedagogical knowledge and content knowledge and learners' background were the predominant challenges encountered by the participants. When they were asked whether there are any challenges they encounter when teaching area and perimeter, they indicated that learners find it difficult to measure objects unsupervised and learners usually lack basics from previous grades, which makes it difficult for them to understand the lesson. The other challenge they face was that learners find it difficult to solve word problems and problem-

solving skills because in previous grades they were not taught so it becomes very challenging to teach the required content properly.

5.8. Concluding statement

The findings in the data generated indicated that teachers have reasonable knowledge of teaching strategies and can identify them. During interviews teachers alluded to the fact that they use teaching strategies like: teacher- centred (lecture) and learner- centred teaching strategies like cooperative learning and constructive learning in their teaching. The findings indicated that teachers can differentiate between teacher- centred and learner- centred teaching strategies. It was revealed that the teachers' favourite teaching strategy is teacher- centred which involves direct teaching. Teachers indicated that they use learner -centred teaching strategies such as cooperative learning, constructivism, group work etc. but the study revealed that little element of learner- centred teaching strategies were used.

The predominant teaching strategy used was teacher- centred for example direct instruction. The findings also indicated that there were both challenges encountered, and successes experienced in the teaching of area and perimeter. For the fact that participants tried their best to include cooperative learning in their teaching, shows that they are aware of the skills that should be imparted to the learners. When participants asked why they are using a teaching strategy, their responses were general. The data generated indicated that the teaching strategies used by teachers were based on knowledge acquired in their daily teaching. The CAPS document only specifies the assessment process but does not indicate the teaching strategies to be used for teaching grade 6 mathematics. Teachers continuously use every day knowledge regarding teaching strategies because there is no guidance exactly on how and when to use a particular teaching strategy.

5.9. Recommendations

- (a) The absence of specification and clarification regarding teaching strategies in the CAPS document amounted to teachers opting to use a single teaching strategy. It is recommended that CAPS document and annual teaching plans specify which teaching strategy and its examples should be used in grade 6 in a content of area and perimeter. There should also be a

monitoring tool as to whether the relevant teaching strategy is used. The implementation of this recommendation will assist both teachers and learners to achieve set goals. Teachers will gain new skills and different ways of teaching while learners will acquire the skills needed in the modern world to interact with and work independently. It is also recommended that teachers should continuously capacitate themselves regarding mathematics and be lifelong learners.

- (b) It is recommended that the curriculum developers broaden the scope of practical work regarding area and perimeter. Subject advisors should prescribe practical work to be commonly done and monitored in the content of area and perimeter. In addition, the teaching strategies to be used in teaching area and perimeter should be clearly specified. The schools should have a space where learners can demonstrate their knowledge of this content area and where they can display their work. It is recommended that schools rather than employing outsiders for work such as building, tiling or any work involving measurement (area and perimeter) should first consult mathematics teachers to provide with the learners who can help in performing that function.
- (c) It is recommended that the mathematics document be reviewed and include guidelines on how a teaching strategy should be used in line with the content. It is recommended that practical topics be consolidated, and relevant teaching strategies be attached and monitored for implementation. It is further recommended that mathematics teachers should be engaged and assisted in teaching strategies and learning activities that will help in achieving the desired goals.
- (d) It is recommended that the Department of Education provides or suggests the resources to be used to achieve shared goals. The Department should also prescribe practical work for example building, tiling and other work to be made by learners at each school regarding this content. As the findings revealed that no computers were used in the classroom, it is recommended that teachers be encouraged to enrol in computer schools to acquire knowledge of using computers. It is suggested that schools build computer laboratories so that mathematics software may be installed and assist teachers and learners.

5.10. Conclusion

In this chapter, the researcher sought to answer these research questions:

- (a) What teaching strategies are used by mathematics teachers in teaching area and perimeter in grade 6?
- (b) Why do mathematics teachers use these teaching strategies when teaching area and perimeter in grade 6?

This chapter presented the interpretation of findings and recommendations from data collected, drawn conclusions and made recommendations from the study. The objectives of the study were to explore teaching strategies in teaching area and perimeter in grade 6 and to understand the teaching strategies used in teaching area and perimeter in grade 6. The teachers showed knowledge of different teaching strategies but lack proper implementation of other strategies.

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Appendix 1: Observation Schedule

1. What strategies used by teachers when teaching area and perimeter?
2. Does the teacher use annual teaching plan when teaching area and perimeter?
3. How much time is spent on teaching area and perimeter?
4. What terminologies (Terms) used by teachers when teaching area and perimeter?
5. Do teachers teach area and perimeter in context?
6. What teaching materials used by teachers when teaching area and perimeter?
7. Does the teacher have pedagogical content knowledge of area perimeter?

Appendix 2: Interview schedule

1. What are teaching strategies?
2. What do you think constitutes teaching strategies?
3. What strategies do you use when teaching area and perimeter?
4. Why do you use these strategies in teaching area and perimeter is suitable?
5. Are there any challenges you encounter when teaching area and perimeter? Describe those challenges.
6. Are there any successes you experience when teaching area and perimeter? Describe those successes.
7. When planning your lesson, do you consider learners background?
8. Does the nature of teaching area and perimeter have a significant effect on the nature and level of learning Measurement? Explain.
9. Which factors influence teaching strategies when teaching area and perimeter?
10. Do you think the teacher subject matter knowledge, pedagogical knowledge, pedagogical content knowledge has an influence in your teaching of area and perimeter? Explain.
11. How do you ensure that the learners have understood the lesson?
12. What were your major subjects in Tertiary Education?
13. Do you consider Measurement as one of the most important content areas in mathematics? Explain.

Appendix 3: Letter to the School Principals



Madide C. H. (Mr)

P O Box 486

Ceza

3866

10 March 2017

Dear Principal

P O Box 355

Ceza

3866

Application for the Permission to conduct Research in your School.

I am **Celenkosini Henry Madide**, currently studying for Masters in Education (course work) in curriculum studies at the University of KwaZulu Natal (Edgewood Campus), Pinetown South Africa. I am conducting a study to ‘explore the teacher’s practices in teaching fractions in grade 6 within CAPS at Mahlabathini Circuit Management Centre in Zululand District. As an educator of mathematics for nine years, I have notice that teacher’s practices has been under- observed and that not sufficient distinction have been made between, instructional activities and teacher’s practices. Fractions are one of the poorly performed content areas in grade 6 mathematics. Therefore, I hereby request permission to conduct this study in three schools. Please note the following:

- The school and educator's confidentiality is guaranteed.
- The observation and interview questions may last for approximately 2 hours.
- Any information given by your educators cannot be used against the school, and the collected data will **only** be used for purposes of this research.
- There will be no incentive or benefit for participation in this project.
- Data will be stored in a coded computer and shredded after 5 years.
- Participating in this research Project is voluntary; participants are free to withdraw at any point if they wish to do so.
- Schools and educator's involvement is purely for academic purposes only, and there is no financial benefit involved.

Yours faithfully

Celenkosini Madide

I can be contacted at:

Cell: 0738072947

Email: chmadide@gmail.com or 216074173@stu.ukzn.ac.za

My supervisor is Dr Maharajh who is a Discipline Coordinator, Curriculum Studies, School of Education, Edgewood College, University of KwaZulu-Natal, and (Tel) 0312603422. (Cell) 0724356968, Email: maharajhr@ukzn.ac.za

You may also contact the Research Office through:

Ximba Phumelele

HSSREC Research Office,

Tel: 0312603587. Email: ximbap@ukzn.ac.za

Thank you in advance for your contribution in this research project.

DECLARATION

I..... (Full names) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent for the school and educators/teachers to participate in the research project.

I understand that the school and educators/teachers are at liberty to withdraw from the project at any time, should they so desire.

.....

SIGNATURE

.....

DATE

STAMP



Appendix 4: Letter to the District Director



Madide C. H. (Mr)

P O Box 486

Ceza

3866

10 March 2017

Dear Sir/ Madam

The Director

Zululand Education District

Private Bag X 9330

VRYHEID

3100

Application for the Permission to conduct Research at Zululand District Schools.

I am **Celenkosini Henry Madide**, currently studying for Masters in Education (course work) in curriculum studies at the University of KwaZulu Natal (Edgewood Campus), Pinetown South Africa. I am conducting a study to ‘explore the teacher’s practices in teaching fractions in grade 6 within CAPS at Mahlabathini Circuit Management Centre in Zululand District. As an educator of mathematics for nine years, I have notice that teacher’s practices has been under- observed and that not sufficient distinction have been made between, instructional activities and teacher’s practices. Fractions are one of the poorly performed content areas in grade 6 mathematics.

Therefore, I hereby request permission to conduct this study in three schools. Please note the following:

- The school and educator's confidentiality is guaranteed.
- The observation and interview questions may last for approximately 2 hours.
- Any information given by your educators cannot be used against the school, and the collected data will **only** be used for purposes of this research.
- There will be no incentive or benefit for participation in this project.
- Data will be stored in a coded computer and shredded after 5 years.
- Participating in this research Project is voluntary; participants are free to withdraw at any point if they wish to do so.
- Schools and educator's involvement is purely for academic purposes only, and there is no financial benefit involved.

Yours sincerely

Celenkosini Madide

I can be contacted at:

Cell: 0738072947

Email: chmadide@gmail.com or 216074173@stu.ukzn.ac.za

My supervisor is Dr Maharajh who is a Discipline Coordinator, Curriculum Studies, School of Education, Edgewood College, University of KwaZulu-Natal, and (Tel) 0312603422. (Cell) 0724356968, Email: maharajhr@ukzn.ac.za

You may also contact the Research Office through:

Ximba Phumelele

HSSREC Research Office,

Tel: 0312603587. Email: ximbap@ukzn.ac.za

Thank you in advance for your contribution in this research project.

DECLARATION

I..... (Full names) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent for the school and educators/teachers to participate in the research project.

I understand that the school and educators/teachers are at liberty to withdraw from the project at any time, should they so desire.

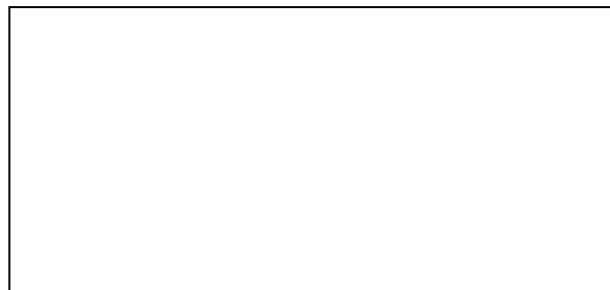
.....

SIGNATURE

.....

DATE

STAMP



Appendix 5: Letter to the CMC Managers



Madide C. H. (Mr)

P O Box 486

Ceza

3866

10 March 2017

Dear Sir

CES: Co-ordinator

Attention to SD Shongwe

Private Bag X 574

Mahlabathini

3866

Application for the Permission to conduct Research at Mahlabathini CMC.

I am **Celenkosini Henry Madide**, currently studying for Masters in Education (course work) in curriculum studies at the University of KwaZulu Natal (Edgewood Campus), Pinetown South Africa. I am conducting a study to ‘explore the teacher’s practices in teaching fractions in grade 6 within CAPS at Mahlabathini Circuit Management Centre in Zululand District. As an educator of mathematics for nine years, I have notice that teacher’s practices has been under- observed and that not sufficient distinction have been made between, instructional activities and teacher’s practices. Fractions are one of the poorly performed content areas in grade 6 mathematics.

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- The school and educator's confidentiality is guaranteed.
- The observation and interview questions may last for approximately 2 hours.
- Any information given by your educators cannot be used against the school, and the collected data will **only** be used for purposes of this research.
- There will be no incentive or benefit for participation in this project.
- Data will be stored in a coded computer and shredded after 5 years.
- Participating in this research Project is voluntary; participants are free to withdraw at any point if they wish to do so.
- Schools and educator's involvement is purely for academic purposes only, and there is no financial benefit involved.

Yours faithfully

Celenkosini Madide

I can be contacted at:

Cell: 0738072947

Email: chmadide@gmail.com or 216074173@stu.ukzn.ac.za

My supervisor is Dr Maharajh who is a Discipline Coordinator, Curriculum Studies, School of Education, Edgewood College, University of KwaZulu-Natal, and (Tel) 0312603422. (Cell) 0724356968, Email: maharajhr@ukzn.ac.za

You may also contact the Research Office through:

Ximba Phumelele

HSSREC Research Office,

Tel: 0312603587. Email: ximbap@ukzn.ac.za

Thank you in advance for your contribution in this research project.

DECLARATION

I..... (Full names) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent for the school and educators/teachers to participate in the research project.

I understand that the school and educators/teachers are at liberty to withdraw from the project at any time, should they so desire.

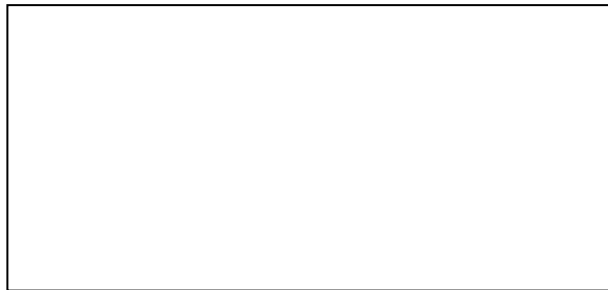
.....

SIGNATURE

.....

DATE

STAMP



Appendix 6: Letter to Participants



Information Sheet and Consent to Participate in Research

Date: 10 March 2017

Dear Sir/ Madam

My name is **Celenkosini Henry Madide** from University of KwaZulu-Natal (Edgewood campus) in South Africa. I am a coursework Master's degree candidate. My email address is 216074173@stu.ukzn.ac.za or chmadide@gmail.com. My contact number is 0738072947 and I reside at kwaCeza in Northern Kwazulu Natal next to Ulundi.

You are being invited to consider participating in a study that involves research about 'An exploration of teaching strategies in teaching Area and Perimeter in grade 6 at Mahlabathini Circuit Management Centre'. The aim and purpose of this research is to gain an in depth understanding about the explored phenomenon of teaching strategies. The study is expected to enrol three participant (one per school). It will involve the following procedures: Observation and interviewing these participants for the acquisition of data. The duration of your participation if you choose to enrol and remain in the study is expected to be one month. The study is funded by myself as a master's student due to lack of sponsorship.

The study may involve the following discomforts, lengthily interview and observation that may consume time. We hope that the study will create the following benefits: develop mathematics teachers' knowledge about teaching strategies and the sufficient understanding of Area and Perimeter.

This study has been ethically reviewed and approved by the UKZN Humanities and Social Sciences Research Ethics Committee (approval number **HSS/0485/017M**).

In the event of any problems or concerns/questions you may contact the researcher at 0738072947 and email 216074173@stu.ukzn.ac.za / chmadide@gmail.com or the UKZN Humanities & Social Sciences Research Ethics Committee, contact details as follows: Research Office, Westville Campus

Govan Mbeki Building
Private Bag X 54001
Durban
4000
KwaZulu-Natal, SOUTH AFRICA
04557-
Fax: 27 31 2604609
Email: HSSREC@ukzn.ac.za

You may also feel free at any time to contact my supervisor at 0312603422 and/ or maharajhr@ukzn.ac.za

Please note that participation in this research is voluntary and participants are allowed to withdraw at any point if they wish to do so. Moreover, no penalties will incur in any withdrawals done by participants. There will be no costs that participants will have to incur for participation in the study. Furthermore, no incentives will be provided to participants for their participation in the study. The following steps will be employed to ensure confidentiality of participants: the use of pseudonyms and anonymity of context of the study. Participants are entitled to review the data of audio records and transcript for feedback and precision purposes. All data derived from the study will be kept safely in the supervisor's office in a coded computer. After a period of five years, this period data will be shredded and destroyed to ensure no further usage.

CONSENT

I _____ have been informed about the study entitled
_____ by

I understand the purpose and procedures of the study.

I have been given an opportunity to answer questions about the study and have had answers to my satisfaction.

I declare that my participation in this study is voluntary and that I may withdraw at any time without affecting any of the benefits that I usually am entitled to.

I have been informed about any available compensation or medical treatment if injury occurs to me because of study-related procedures.

If I have any further questions/concerns or queries related to the study I understand that I may contact the researcher at _____

If I have any questions or concerns about my rights as a study participant, or if I am concerned about an aspect of the study or the researchers then I may contact _____

Additional consent, where applicable

I hereby provide consent to:

Audio-record my interview YES / NO

Appendix 7: Permission letter from KZN DOE



education

Department:
Education
PROVINCE OF KWAZULU-NATAL

Enquiries: Phindile Duma

Tel: 033 392 1041

Ref.:2/4/8/1173

Mr CH Madide
PO Box 486
Ceza
3866

Dear Mr Madide

PERMISSION TO CONDUCT RESEARCH IN THE KZN DoE INSTITUTIONS

Your application to conduct research entitled: "AN EXPLORATION OF TEACHER'S PRACTICES IN TEACHING FRACTIONS IN GRADE 6 WITHIN CAPS AT MAHLABATHINI CIRCUIT MANAGEMENT CENTRE", in the KwaZulu-Natal Department of Education Institutions has been approved. The conditions of the approval are as follows:

1. The researcher will make all the arrangements concerning the research and interviews.
2. The researcher must ensure that Educator and learning programmes are not interrupted.
3. Interviews are not conducted during the time of writing examinations in schools.
4. Learners, Educators, Schools and institutions are not identifiable in any way from the results of the research.
5. A copy of this letter is submitted to District Managers, Principals and Heads of Institutions where the Intended research and interviews are to be conducted.
6. The period of investigation is limited to the period from 15 March 2017 to 07 June 2019.
7. Your research and interviews will be limited to the schools you have proposed and approved by the Head of Department. Please note that Principals, Educators, Departmental Officials and Learners are under no obligation to participate or assist you in your investigation.
8. Should you wish to extend the period of your survey at the school(s), please contact Miss Connie Kehologile at the contact numbers below
9. Upon completion of the research, a brief summary of the findings, recommendations or a full report/dissertation/thesis must be submitted to the research office of the Department. Please address it to The Office of the HOD, Private Bag X9137, Pietermaritzburg, 3200.
10. Please note that your research and interviews will be limited to schools and institutions in KwaZulu-Natal Department of Education.

Zululand District

Dr. EV Nzama
Head of Department: Education
Date: 16 March 2017

..Championing Quality Education - Creating and Securing a Brighter Future

KWAZULU-NATAL DEPARTMENT OF EDUCATION

Postal Address: Private Bag X9137 • Pietermaritzburg • 3200 • Republic of South Africa

Physical Address: 247 Burger Street • Anton Lembede Building • Pietermaritzburg • 3201

Tel.: +27 33 392 1004/41 • Fax.: +27 033 392 1203 • Email: Kehologile.Connie@kzndoe.gov.za/Phindile.Duma@kzndoe.gov.za • Web:www.kzndoe.gov.za

Facebook: KZNDOE...Twitter: @DBE_KZN...Instagram: kzn_education...Youtube:kzndoe

Appendix 8: Ethical Clearance from UKZN



UNIVERSITY OF
KWAZULU-NATAL
INYUVESI
YAKWAZULU-NATALI

05 July 2017

Mr Celenkosini Henry Madide (216074173)
School of Education
Edgewood Campus

Dear Mr Madide,

Protocol reference number: HSS/0485/017M

Project title: An exploration of teachers practices in teaching fractions in Grade 6 within CAPS at Mahlabathini Circuit Management Centre

Approval Notification – Expedited Application

In response to your application received on 04 May 2017, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol has been granted **FULL APPROVAL**.

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

Dr Shenuka Singh (Chair)

/ms

Cc Supervisor: Dr Lokesh Maharaj
Cc Academic Leader Research: Dr SB Khoza
Cc School Administrator: Ms Tyzer Khumalo

Humanities & Social Sciences Research Ethics Committee

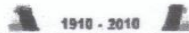
Dr Shenuka Singh (Chair)

Westville Campus, Govan Mbeki Building

Postal Address: Private Bag X54001, Durban 4000

Telephone: +27 (0) 31 260 3587/8350/4557 Facsimile: +27 (0) 31 260 4609 Email: ximbap@ukzn.ac.za / snymam@ukzn.ac.za / mohunn@ukzn.ac.za

Website: www.ukzn.ac.za



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Founding Campuses: Edgewood Howard College Medical School Pietermaritzburg Westville

Appendix 9: Turnitin Certificate

7/2/2018

Turnitin

Celenkosini Madide User Info Messages (1 new) Student English Help Logout

Class Portfolio My Grades Discussion Calendar

NOW VIEWING: HOME > EDUCATION STUDIES 320 (2017)

Welcome to your new class homepage! From the class homepage you can see all your assignments for your class, view additional assignment information, submit your work, and access feedback for your papers. ✕

Hover on any item in the class homepage for more information.

Class Homepage

This is your class homepage. To submit to an assignment click on the "Submit" button to the right of the assignment name. If the Submit button is grayed out, no submissions can be made to the assignment. If resubmissions are allowed the submit button will read "Resubmit" after you make your first submission to the assignment. To view the paper you have submitted, click the "View" button. Once the assignment's post date has passed, you will also be able to view the feedback left on your paper by clicking the "View" button.

Assignment Inbox: Education Studies 320 (2017)

	Info	Dates	Similarity	
M Ed Dissertation (2018)	ⓘ	Start 26-Sep-2016 8:00AM Due 31-Jul-2018 11:59PM Post 31-Jul-2018 12:00PM	4%	Resubmit View

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Appendix 10: Language Editor Certificate

Angela Bryan & Associates

6 La Vigna
Plantations
47 Shongweni Road
Hillcrest

Date: 29 June 2018

To whom it may concern

This is to certify that the Masters Dissertation: An Exploration of Teaching Strategies in Teaching Area and Perimeter in Grade 6 at Mahlabathini Circuit Management Centre written by Celenkosini Henry Madide has been edited by me for language.

Please contact me should you require any further information.

Kind Regards

Angela Bryan

angelakirbybryan@gmail.com

0832983312