University of the Witwatersrand

School of Education

Exploring teachers' understanding of curriculum change from National Curriculum Statement (NCS) to Curriculum and Assessment Policy Statement (CAPS) in the teaching of Grade 8 Maths in township and former Model C schools in Gauteng.

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A research report submitted to the School of Education, Faculty of Humanities, University of the Witwatersrand, Johannesburg in partial fulfilment of the requirements for the degree of

Master of Education (MEd)

By coursework and research report

HREC Ethic Clearance

Protocol Number: 2011ECE104**C**

Supervisor: Bronwen Wilson-Thomson

Date submitted: 27th of May 2015

Acknowledgements

I am very grateful for the assistance and direction of Bronwen Wilson-Thomson in the preparation of this research report. She has been a constant support and an encouraging figure towards the completion of this project. Her passion in her work was always amazing and inspirational.

I would also like to thank my wife Sihle Mlambo for her all-round support; my boys Zigidi and Ziyanda for their understanding. Nalanie Naidu who, as my manager, kindly provided me with all kinds of resources I have needed to see this project to its completion.

From a personal perspective, this work has taught me never to be judgmental when examining a person's practice. To this effect, I have learnt to challenge myself to increase the level of understanding and respect of other people's point of view about the areas they operate in. I have learnt to limit the deficit language in my conversations with and about other people. And for this, I remain forever grateful.

_____UNIVERSITY OF THE WITWATERSRAND_____

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Course Name	:	Research Report
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Abbreviations

HSRC	Human Science Research Council
C2005	Curriculum 2005
CAPS	Curriculum and Assessment Policy Statement
DoE	Department of Education (pre-2009)
GDE	Gauteng Department of Education
HOD	Head of Department
Maths	Mathematics
NCTM	National Council of Teachers of Mathematics (in the US)
LCD	Levels of Cognitive Demand
OBE	Outcomes Based Education
NCS	National Curriculum Statement
RNCS	Revised National Curriculum Statements

Abstract

What are teachers' understanding of curriculum change and how they think it affects their practice in a pedagogic setting? Whilst this may be thought of as a straight-forward answer,
this study has interestingly demonstrated that teachers' understanding does not follow the simplified prescription of the curriculum but their understanding of their own contexts and how they view that affects their pedagogic practice.

Studies of teachers' responses to curriculum change have overlooked the underlying factors around teachers' willingness or unwillingness to change. In-depth interviews allow the study to explore teachers' understanding of curriculum change in the context of South African educational reform. In this regard, whilst a simplistic answer to the questions of this study, teachers have displayed highly-ordered and well-reasoned viewpoints on how their understanding of curriculum change shape their pedagogic practice. This has made the researcher to categorise teachers' responses into three pre-determined themes described by Bernstein (1996): knowledge, pedagogy and assessment whilst using the fourth – social context of learners – as background of interpreting the findings of the study. This research project unsurprisingly concludes that teachers hold a wide variety of views about curriculum reforms and implementation in South Africa. Both the primary and secondary data sources indicated that curriculum in South Africa is progressing towards more prescriptive approaches.

Keywords: Curriculum change, knowledge, pedagogy, assessment, social context, curriculum document, curriculum principles, integration and sequencing, intended and enacted curriculum, parental involvement, teachers' understanding, learners, school reform, prescriptive, textbook use, instructional discourse, regulative discourse instruction.

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CHAPTER 1

TITLE

Exploring teachers' understanding of curriculum change from National Curriculum Statement (NCS) to Curriculum and Assessment Policy Statement (CAPS) in the teaching of Grade 8 Maths in township and former Model C schools in Gauteng.

Problem Statement

The theme of education and social change has been heavily explored both internationally and locally (Human Sciences Research Council (HSRC), 2004). It has become apparent that many problems are related to the curriculum (HSRC, 1981), specifically the changes in curriculum. McMillan and Schumacher (2006) have stated that "as waves of reform are consistently emerging, instability has occurred in curriculum, standards and accountability' (p. 16). However, curriculum change is not unique to South Africa; it is a global phenomenon. Pillay (2004) argued that "little has been written about the effects of such changes" in the pedagogical practices of teachers in their classrooms. South Africa has already experienced three instances of curriculum reform in the past 18 years. The first post-apartheid curriculum intervention, introduced in 1998, was known as *Curriculum 2005 (C2005).* The second, which was prompted by the review of the first, was known as *Revised National Curriculum Statement (RNCS) Grades R-9 (2000)* and the *National Curriculum Statement (NCS) Grades 10-12* (2002) and the third current one, the *Curriculum and Assessment Policy Statements (CAPS)* (2012). The NCS for the General Education and Training band built on the vision and values of the South African Constitution, and on the review of C2005. There were two pedagogical principles that underpinned the NCS: a high level of knowledge and skills for all, and progression and integration. "The ongoing implementation challenges resulted in another review in 2009" (CAPS Document Grade 7-9: Mathematics), which prompted the third intervention – CAPS. The aim of this intervention was mainly characterised by *what was to be taught and learnt* and *on a term-by-term basis.* At face value, this appeared to be a more prescriptive curriculum.

However, the implementation of any curriculum is dependent on teachers; "how teachers make sense of the curriculum, what they oppose, what they regard as assisting…." (Department of Education (DOE), 2009, p. 15). Some, argue that 'the effectiveness of a change project stands or falls with the extent to which front-line implementers use new practices with degrees of mastery, commitment and understanding' (Preed, 1989, p. 146). What this means is "that teachers are makers of curriculum rather than simply transmitters of someone else's curriculum' (Hoadley & Jansen, 2009, p. 44). Little has been studied about the transition of teachers from an old curriculum to a new curriculum (in this case, from NCS to CAPS).

This study will focus upon and explore teachers' understanding (beliefs, thoughts, feelings and experiences) of the shift from NCS to CAPS in the teaching of grade 8 Mathematics. It seeks to understand teachers' beliefs or their framework of understanding curriculum change. Specifically, the study intends to explore teachers' understanding on the views about the principles underlying the new curricula; views on the teaching of mathematics and views they have about their own pedagogic practices in the context of the changing curricula. Furthermore, the study will investigate the effect of learners' social context on teachers' understanding of curriculum change. It will use Bernstein's (1996) triple message system which is knowledge, pedagogy, and assessment, as the framework of analysis of teachers' understanding of the curriculum change.

Mathematics was chosen as a focal point for the study as it is the subject I taught for eleven years, as well as the subject I specialised in as a District Facilitator in Mathematics during the Department of Education's teacher training for Curriculum 2005 (1998-2002), and for the Revised National Curriculum Statement (2003-2004).. Furthermore, I specialised in Mathematics Education in my earlier studies (Further Diploma in Education & Bachelor of Education 1997-2000) at the University of the Witwatersrand, Johannesburg. The choice of grade 8 is justified by the fact that it is a foundation of secondary school Maths and thus it was anticipated that teachers at this level might prove a valuable source of data as well as be more available as participants.

Rationale

As a former teacher, head of department, curriculum coordinator at school level, and the C2005 Training Facilitator at district level in KZN, the researcher has been directly involved in curriculum change. In this study, it was observed that teachers' understanding of curriculum and what it seeks to deliver does not seem to resonate with teachers' practice at the implementation stage. Citing Naidoo and Parker, (2005a; 2005b), Krishnannair and Christiansen (2013) say:

> Classroom instruction has been significantly influenced by teachers' views on the nature of mathematics teaching and on the nature of assessments teachers use. Such views on mathematics and assessment in mathematics are, in several ways, at odds with the notions in national curricula and policies, both implicit and explicit. (p. 256)

It is also a well known fact that teachers' understanding of their pupils' performance is 'informed by their tacit understanding of pupils' social class position' (Dunne & Gazeley, 2007). The study therefore explored the influence of schools and learners' social backgrounds on teachers' understanding of curriculum change. In essence, it will look at how teachers' understanding of curriculum change affects their pedagogic practices in a socio-cultural context. Accordingly, the questions that the study is asking are: do teachers understand the central principles that underlie the latest curriculum interventions? Does social background play any role in their understanding of curriculum change? The assumption here is that teachers' pedagogical practices and their social contexts underpin, or are underpinned by, their understanding of curriculum change. Teachers are the prominent drivers of any curriculum intervention and the extent of their understanding indicates the success or failure of that intervention.

Because the study explores teachers' understanding of educational change, the researcher believes that it will provide the framework for bottom-up considerations by policy makers, including knowledge of how teachers perceive change and a clearer understanding of what works in practice. It will therefore contribute to the body of

knowledge of school administrators, principals and curriculum specialists, and research, to better understand the implications of curriculum change in the reality of pedagogical practice.

Research Question

The study intends to answer the following question:

What is the grade 8 Maths teacher's understanding of curriculum change from National Curriculum Statement to Curriculum and Assessment Policy Statement?

Sub-Questions

1. How do the teachers understand the fundamental principles underlying the latest South African curriculum interventions – NCS and CAPS?
2. In what way does the social class of learners have an effect on teachers' understanding of curriculum change from NCS to CAPS?
3. In what way do grade 8 Maths teachers believe that the curriculum change from NCS to CAPS affects their pedagogic practice in the teaching of Mathematics in class?

Theoretical Framework

This section deals with the review of literature, providing the lens for interpreting the findings, which in turn will help to answer the above research questions. Accordingly, the study will look at where South Africa comes from with regards to educational reform (Jansen, 1999; Christie, 1999; Fleisch, 2002; Chisholm, 2005; Hoadley and Jansen, 2009), in an attempt to provide sufficient knowledge in the process of answering sub question (1). This will help provide an insight into the findings on teachers' understanding of curriculum change in general. To this effect, the study will also be looking at the two previous curriculum interventions (NCS and CAPS) that have recently taken place in South Africa, whilst using C2005 as a background. In this, it will

focus on the principles that underlie these interventions and what sort of theoretical significance each of them provides for this study. Furthermore, the study will use literature on curriculum change, teachers and social class, and teachers' assessment, and how all this affects teachers' understanding in their pedagogical practice (Bernstein, 1975, 1990, 1996, 2000; Singh, 2002; Vygotsky, 1978; Naidoo, 2009; Morais & Miranda, 1996; Barrow, 1984; Harap, 1937; Egan, 1978; Eisner & Vallence, 1974; Dewey, 1902; Bobbitt, 1972; McNeil, 1977; Goodlad, 1984; Fullan, 2009; Barber, 2000, 2008, 2009), in order to be theoretically accurate in the data to be collected, in analyzing the findings, and working towards providing answers for sub question (2). Specifically, the study will look at learners' assessment work in the two schools selected for research in order to determine teachers' understanding of their own assessment practices, and to find out if there are any relations between these responses and teachers' understanding of curriculum change.

Conceptual Framework

Because the study had its focus on Mathematics, it will also look at the features of change in Mathematics education in the context of South Africa, specifically on assessment and whether and how these changes affect the coding orientation (recognition and realization rules) (Morais & Miranda, 1996) of learners in a pedagogical context. The introductory part of the Mathematics CAPS document on assessment looks at it as integral part of teaching and learning: "Assessment should be both informal and formal. In both cases regular feedback should be provided to learners to enhance their learning experience" (DOE: CAPS, 2012, p. 154).

CAPS, as a new curriculum intervention in South Africa, appears to have a very strong 'framing' in terms of assessment in that it openly specifies types of assessments to be conducted (selection), and when these should be conducted (pacing) (Bernstein 1996). Bernstein's literature will provide the basis for understanding the views of teachers in the context of curriculum change and also form the framework of analysis for the research. As such, when looking at knowledge, pedagogy and assessment (Lingard, Hayes & Mills, 2003; Sadovnik, 1995; Bernstein, 1996), classification and framing will

be illuminated as the lenses through which data will be examined for the study. Bernstein's (1996) definition of classification is that it does not refer to what is classified, but to the relationship and degree of boundary maintenance between contents (p. 56). Framing, on the other hand, refers to the degree of control teacher and pupil possesses over selection, organization, pacing, and timing of knowledge transmitted and received in the pedagogical relationship (p. 57). This approach to literature will thus provide a necessary platform in an attempt to provide answers for sub-question (3) above.

CHAPTER 2

Literature Review

Curriculum Change

Jackson (1980), in his *Curriculum and its Discontents,* argues that curriculum enquiry is characterised by confusion and conflict. He cites many observers who attest to this view about curriculum, like Barrow (1984); Harap (1937); Egan (1978); Eisner and Vallence (1974); Dewey (1902); Bobbitt (1972), McNeil (1977) and Goodlad (1984), among others. According to Jackson, this state of affairs about curriculum is observed by people at a distance and from within; by people who work with it whom he refers to as 'curriculum specialists'. In their article, Tyack and Tobin (1994) are asking, and endeavouring to answer, the question of how the grammar of schooling become so institutionalized that every attempt to challenge it has either faltered or fallen by the way side. The assumption in this approach to curriculum is that everyone has the same pace of learning and the same preferences, cutting across all socio-cultural differences. For example, in a mainstream school, learners are classified into grades and the teachers (mainly females) follow the prescribed curriculum strictly. It is biased towards urban schools and actually marginalized the rural ones.

Therefore the definition of curriculum has been a much contested concept in the field of education. Every definition is fighting for recognition in the space of the curriculum as a field of study. According to Egan (1978), 'curriculum is the study of any and all educational phenomena' (p. 71). His article argued that curriculum is mainly concerned about *what* is taught more than *how* it is taught. According to Egan, curriculum as a field of study is not static but dynamic, keeps on evolving, and is characterized by conflict and confusion, some emanating from definition. This is the perspective that this study will use in looking at curriculum. However, there are certain fundamentals that have confronted reformers, such as the position of the teacher, setting up of learning space, etc.

In any country, curriculum is used not only to achieve that country's political goals but also socio-economic goals. And those goals keep on changing, thus curriculum is not immune to the process of change. *The Overview Report* on C2005 concurs with this view when it spells out that 'the Constitution of the Republic of South Africa, 1996 (Act No 108 of 1996) provides the basis for curriculum transformation (change) and development in the contemporary South Africa' (p. 6). Internationally, change, and particularly curriculum change, is an inescapable feature of the education landscape.

In any social context, there are always two contending positions about the general progress of a society. There are those that favour change and those that prefer the status quo. Jackson (1980), refers to them as reformers (or progressives) and the conservatives (or traditionalists) respectively. Therefore, rather than becoming obsessed with stabilising the curriculum, as the Review Report on NCS (2009) argues, by trying to find a more comfortable position (a position that will be accepted by all and that is envisaged as suitable to accomplish all aspirations of those who work with it) in it, there should be an endeavour to move with the wave of reform in a way that benefits those who work with the curriculum, and those for whom it is intended. In the wave of any curriculum reform, confusion and conflict is also inevitable (Jackson 1980). The source of this confusion emanates from, among others, the chaotic state of curriculum terminology (Kliebard in Jackson, 1980) and ill-defined epistemology (Goodlad, in Jackson, 1980), and the implementation approaches, which impact on the pedagogical practices of teachers.

In the environment of change, there is more elaboration about the new direction whereas in the status quo environment, there is no elaboration about any direction. The fact that there is inevitable change in curriculum, means it is only fair to enable teachers' participation by at least getting them to be aware of their own understanding of this change and how it impacts their pedagogical practices. Several directions need to be noted for them as many scholars of curriculum warn (Dewey, 1902; Bobbitt, 1972; McNeil, 1977; Eisner & Vallence, 1974). Some focuses on the psychological nature of the learner and social conditions inside and outside the school (Bobbitt, 1972). McNeil (1977) looks at it in terms of four conceptions of curriculum: humanistic, social

reconstructivist, technological, and academic. The social reconstructivist view, which will be used in the analysis of data, introduces a social dimension to human development.

History of Curriculum Change in South Africa

Curriculum change in South Africa has been very dramatic. The *White Paper on Education and Training* (1995) (DOE, 1995) stressed a need to normalise and transform teaching and learning in South Africa by shifting from the traditional aims-and-objectives approach to outcomes-based education. Then the National Curriculum Framework Document (1996) became a major curriculum statement of a democratic South Africa. It emphasized the recognition of Lifelong Learning. All this and other efforts resulted in Curriculum 2005 (C2005). C2005 came into existence in 1998 and was widely received by many stakeholders, including teachers (NCS Review Report, 2009, p. 12). It was an ambitious, outcomes-based strategy which advocated using teachers' creativity to provide opportunities for learners to construct knowledge and skills for themselves.

C2005 was widely criticised: Jansen (1997) predicted its failure before it began and later (1999) labelled it 'too complex, confusing and at times contradictory' (p. 147), whilst Fleisch (2002) characterises C2005 as 'prescriptive on pedagogy and technical planning but *too quiet on areas of content* [emphasis added]' (p. 151). Christie (1999), on the other hand, blames the theory of change as much as the policy content, noting deep-rooted problems in 'the way the new departments of education have interpreted their policy task; the way they have approached school change and the difficulties they have faced in managing change' (p. 280).

Christie (2008) argued that 'less well-trained teachers were under-resourced for teaching the new curriculum' (p. 142) and this led to an increase rather than a decrease in equity. As criticism mounted, the government refused to make a clean break with a failing policy and instead made dramatic alterations in 2002, with the addition of much guidance on what should be done when, and more focus on content. The government's

response was the National Curriculum Statements (NCS) which marked the beginning of a shift in focus back towards content prescriptions. The NCS was 'organised around knowledge (*content* [emphasis added] and skills) to be learnt, with recommended texts, pedagogical approaches and assessment requirements' (RNCS Implementation Task Team Review, 2010, italics added). Though the NCS tried to make sweeping changes to C2005, it was not completely successful. Whilst Chisholm (2005) states its aim was 'to make it [C2005] more understandable in South African classrooms' (p. 80), she also notes that 'the curriculum was perceived [by the South African Democratic Teachers' Union amongst others] as being more aligned to 'the old style syllabus' reminiscent of the apartheid era' (p. 90-91).

The NCS was 're-codified' into the Curriculum and Assessment Policy Statements (CAPS) that began to be implemented in 2012. The Review Report on NCS (2009) makes an argument for the alignment of curriculum processes, which means that curriculum standards should be able to specify curriculum knowledge, and assessment standards to specify the cognitive demands; it also reveals issues around learner progression (p. 16). The aim of the CAPS was to add a greater degree of coherence as it sought to strengthen the NCS, learning programme guidelines, and subject assessment guidelines, in one document per subject per phase.

This change in the South African curriculum also affected the view of knowledge both at policy (regulative discursive) level and in pedagogical contexts (instructional discursive level). To help understand these changes around knowledge, the study has looked at Bernstein's (1996) articulation of knowledge in the curriculum: (1) selection of knowledge, (2) organization of knowledge, and (3) transmission of that knowledge. In this regard, the study will use Bernstein's (1996) concept of classification to look at the impact of the use of boundaries that arguably exists between the everyday and school knowledge, and the accompanying effect that this use has on conceptual progression in the pedagogic practice. In an investigation of C2005, Naidoo (2009) used two schools of varied social backgrounds and school contexts in order to determine the effects of weakening or strengthening the boundaries of two types of knowledge at various discursive levels. The types of knowledge referred to were: everyday, localized,

common or horizontal knowledge *and* school, delocalized, uncommon or vertical knowledge. In her study, she wanted to understand teachers' use of one type of knowledge as opposed to the other.

Bernstein's (1996) definition of classification is that:

> Classification … does not refer to what is classified, but to the relationship between contents. Where classification is strong, contents are well insulated from each other by strong boundaries. Where classification is weak there is reduced insulation between contents for the boundaries between contents are weak or blurred. It refers to the degree of boundary maintenance between contents. (p. 56)

On the other hand, this study will use Bernstein's (1996) concept of framing in order to understand the orientation of teachers in their evaluation of context in the setting and marking of students' assessment work. This assisted in discovering how teachers choose assessment tasks, and how the choices of those tasks, and teachers' understanding of forms of knowledge, influence their understanding of their own pedagogic practices with regards to assessment. This has helped reveal, among other things, the degree of involvement of both learners and teachers in the choice of assessment work.

Again, Bernstein's (1996) definition of framing is that:

> It refers to the degree of control teacher and pupil possess over selection, organization, pacing and timing of knowledge transmitted and received in the pedagogical relationship. (p. 57)

Hoadley (2007) argued that framing is concerned with the level of interaction and *relations within* boundaries (p. 683). Framing, in a sense, supports classification; it produces the animation of the power grid (Hasan, 2002) but it also opens up the potential for the change of boundaries; the contesting of power relations. It is through interaction (framing) that boundaries between discourses, spaces, and subjects are defined, maintained, and challenged.

The concept of valued knowledge translates to the forms of knowledge and the way these are transmitted and learned, and also the interaction of these forms of knowledge in enabling or hindering the process of transmission and or acquisition. Bernstein's (1975, 1996) concepts of horizontal knowledge and vertical knowledge are useful in further unpacking the concept of valued knowledge. It will be important to explore, in the gathering of data, how these forms of knowledge interact with each other in the social contexts of the schools where the research will take place.

The structure of knowledge is a contested subject for the sociologist and those interested in working with curriculum both from outside and inside educational settings. Whereas the organization of knowledge constitutes curriculum, the transmission of that knowledge constitutes pedagogy (Bernstein, 1995). Bernstein (1975) looks at the principles of pedagogic transmission, acquisition, their generating context, and change.

He pursues this using an analysis that distinguishes between two fundamental forms of discourse: horizontal and vertical discourses. According to Bernstein (1996) horizontal discourse is typified as segmented across contexts. Vertical discourse, on the other hand, refers to a form of knowledge that is 'coherent, explicit, systematically principled and hierarchically organised' (Bernstein, 1996, p. 159). These are 'generally seen as oppositional rather than complementary' (Bernstein, 1996). One form is mainly seen as a dominant force upon the other in that it is sometimes viewed as a written form, whilst the other is seen as an oral form. 'In an educational field, one form is sometimes referred to as school(ed) knowledge and the other as everyday common-sense knowledge, or 'official' and' local' knowledge' (pg. 158). His approach in the paper is not one that seeks to generate either oppositions and or similarities of these discursive forms, but rather an 'attempt seeking to ..... produce a language of description which results to greater differentiation within and between these forms' (pg.158). It is interesting to note from his work that knowledge and the social background of both the learner and the teacher are somehow connected and this study will deal with this later in the discussion.

According to him, the commonality of the horizontal discourse is derived from the fact that, 'all have access to it, applies to all, it has common history' (p. 159). These

characteristics are inherent to this form of discourse, be it oral, local, context-dependent and specific, tacit, multi-layered, and contradictory across, but not within, concepts. This way of thinking has implications for the production, distribution and reproduction of official knowledge and how this knowledge relates to structurally determined power relations in education. Knowledge is differentiated in segmented forms, giving rise to the idea of some segments being more important than others. In other words, in a horizontal discourse the importance of knowledge is attached to its producer. For instance, if the producer of a knowledge segment enjoys a position of respect in the social hierarchy, it is likely to enjoy an advantaged space in the pedagogical context. As such, that space cannot be separated from the social background of the producer of that knowledge. Thus, knowledge organized in a horizontal discourse depends on and is specific to a particular context. It has the characteristics of on-going practices, making it culturally localised. The goals do not go beyond the context of enactment. As a result, others have found that working class learners will, in the main, be more limited to recognition rules than middle class learners (Morais & Miranda, 1996). Recognition rules, as used here, will entail a low level of abstraction in the acquisition of knowledge – *a low level of cognitive competencies* (Morais, Fontinhas, & Neves., 1992).

To further elaborate on these forms, Bernstein looks at the question of how knowledge is circulated in these two discourses. Circulation in terms of vertical discourse is 'accomplished through explicit recontextualisation and evaluation, motivated by strong distributive procedures' (p. 159). In a horizontal discourse, the distributive rules regulate the circulation of knowledge, behaviour and expectations according to status/position.

When he turns to vertical discourse, two forms of 'knowledges' become the basis for the circulation of strategies: hierarchically organised knowledge, which he later refers to as hierarchical knowledge structures; and a series of specialised languages. Contrasting horizontal discourse with vertical discourse, Bernstein views the latter as an integrated discourse and not segmented like the former. The integration takes place only at the level of meanings. The social units of pedagogy of vertical discourse are constructed, evaluated, and distributed to different groups and individuals, structured in time and space by principles of recontextualisation (Bernstein, 1996, p. 161). Whereas,

hierarchical knowledge structures are produced by 'integrating' code, an horizontal knowledge structure of vertical discourse 'consists of a series of specialised languages....' (p. 162). According to him, Mathematics would be considered a horizontal knowledge structure with a strong grammar (that which encourage/discourage the acquisition or transmission of knowledge), whereas Sociology, Social Anthropology and other cultural studies would be examples of knowledge structures with a weak grammar. This is partly because Mathematics, and other subjects like it, measure mostly with objectivity rather than subjectivity and the hierarchical structure of knowledge organisation. The CAPS document stipulates cognitive levels and accompanying skills to be attained by a learner in each concept that is taught. For example, any assessment activity should approximately depict: 25% knowledge, 45% routine procedures, 20% complex procedures and 10% problem solving. From this, one can observe that almost 65% emphasis of any assessment work in mathematics is placed on procedure against the 35% of knowledge and problem solving. The 65% of procedure is accompanied by the skills of basic order of application and also higher order of reasoning (Department of Education, 2012, p. 157). The examples of assessment that promote these cognitive competencies are projects and investigations, among others. This clearly places emphasis on objectivity more than subjectivity and thus qualifies as a horizontal knowledge structure of vertical discourse.

Pedagogy

For Bernstein (1996), pedagogical practice affects the 'mode of acquisition'. It follows that the type of knowledge to be acquired determines the form of pedagogy required to transmit that knowledge. And thus, pedagogic interventions for teaching one subject may not necessarily translate to the teaching of another subject. Learning in one context does not necessarily translate to learning in another context. He argues that in order 'to make specialised knowledges more accessible to the young, segments of horizontal discourse are recontextualised and inserted in the content of school subjects' (169). The fact that these two discourses originate from different sources means there will always be a notably strong classification between them in the manner they are dealt with in the pedagogical setting. There are also boundaries that exist within one domain of

knowledge itself. For instance, a mundane/horizontal knowledge in a well developed community can be esoteric/vertical knowledge, or part of specialised knowledge, in an under-developed community. When it comes to this study, it will be argued that when mathematical concepts are explicitly categorized, it implicitly communicates to the teacher and learners that concepts in mathematics do not integrate.

However, there are limiting factors to the recontextualisation of horizontal discourse to a vertical discourse. Those factors would relate to space, time, disposition, social relation and relevance. This leads to the discussion of pedagogising knowledge, which entails integrating everyday/mundane knowledge into school/more powerful or specialized knowledge. Singh's (2002) exploration of 'Bernstein's concept of pedagogic device', views it 'as the ensemble of rules or procedures via which knowledge is converted into classroom talk, curricula and online communication' (p. 571). According to him, 'the dimension and complexity of the pedagogic device as a model for analysing the processes' where mundane knowledge is converted or pedagogised into school knowledge, has its bearing on certain defining factors. These defining factors look at the economic importance of that knowledge as well as its social significance. Another implication that is cited by others (Hasan, 2002) is the fact that the extreme approach to weakened boundaries of knowledge (weak classification) gives rise to integrated code and compromises conceptual development as demanded by vertical knowledge disciplines. Alternatively, findings from other studies in the same space have concluded that a teacher with high conceptual demand can enhance understanding (Morais & Miranda, 1992). And this happens when there is not only strong classification between the two types of knowledge, but when the distinction between specialized and non-specialized knowledge types is strong enough that it enhances or deepens the former, without dominating the latter. Therefore, those who are involved in the process of re-contextualisation should be aware of this and note that conceptual progression refers not only to the status of hierarchy or complexity of the school knowledge but also to the number of concepts being dealt with (Naidoo, 2009). In other words, the vertical knowledge, to a certain degree, has some elements of the horizontal embedded in it.

Using Bernstein (1990, 1996, 200), Singh looks at the rules of the pedagogic device: *distributive, recontextualising and evaluative,* and the relationships that exist between these. He further examines the stages that the process of pedagogising knowledge takes in order to shape what goes to school knowledge. The three fields, as he calls them, are: *production, recontextualisation, and reproduction.* According to him, pedagogising knowledge is not a simple matter of taking every day, local, common, and mundane knowledge and 'mechanically' customising it into a school, esoteric, sacred knowledge. For him, it is a complex process that is characterized by factors that are deemed important in the society in which this process unfolds (Bernstein, 1990). Irrespective of the era we find ourselves in, schooling institutions are not obsolete in their significant role of distribution of knowledge. Therefore the social context that the school creates; the informal, virtual learning communities (like a family and the contexts they create for their children) will determine if the school will be successful in living the ideals of the curriculum or not.

He maintains that there are three ordering and disordering principles of pedagogising knowledge: *distributive, recontextualising and evaluative* rules. These ordering or disordering rules are hierarchically related. What this means is that one rule builds on the foundation of the other. For example, there is no existence of recontextualising rules without distributive rules, and likewise with evaluative rules and recontextualising rules. Distributive rule is about power relations in a social context. These power relations are the forces responsible for assigning different orientations to meaning or pedagogic identities. In the context of South Africa, these power relations play themselves out at the level of the government or even beyond to politicians where they grapple with what needs to be taught, how, and most importantly, why.

Recontextualisation of knowledge is a field between production and reproduction of knowledge. Its rules, on the other hand, 'regulate the formation of specific pedagogic discourse'. They are rules for 'delocating a discourse, for relocating it, for refocusing it' (Bernstein, 1996). This means, according to Singh (2002), moving a discourse from an 'original site of production' to another site in order to alter it and create a relationship between it and the new discourse/site. Through this exercise, the discourse ceases its

original form to resemble the new. It is possible that in other times, this process may result in the loss of the original meaning of the intended discourse. Besides, those learners that may find it difficult to transcend their dominant discourse, to a discourse of the specialized, might be disadvantaged in the process. Therefore, the process of recontextualising knowledge is a socially and culturally located one. Curriculum interventions and those who work with them must, at least, be aware of this so that their actions are appropriate.

On the other hand, the reproduction of knowledge, according to Bernstein, points to two contexts for its transformation. Firstly, it points to the 'conversion of knowledge appropriated from the field of production within the official and pedagogic recontextualised field' (Singh, 2002, p.577), and secondly, 'the translation of the pedagogised knowledge by teachers and students in the recontextualising field of the school/classroom' (p. 577).

However, even well-intended 'instructional reforms can advantage the students who are 'best-positioned' to reap their benefits, while disadvantaging others' (Lubienski, 2004, p.108). In any curriculum intervention, not only in South Africa, the aspirations of policy do not necessarily translate to practice. For example, the means of dealing with knowledge from 'its origins' to where it is made school/scientific knowledge as it goes through various stages might distort the originally intended discourse. Some call this the implications of the enacted curriculum (Rose, 2004). Bernstein (1977) refers to it as the invisible pedagogy where there is generally a weak framing and classification, which includes weakening the authority of the teacher and blurring the boundary between everyday knowledge and school knowledge. In this regard, the interaction of teachers with the curriculum, using textbooks as a tool, bears discussing.

Textbook Use and Curriculum Understanding

Teachers do not directly use curriculum documents in their everyday teaching. In many cases, textbooks become their bridge to the curriculum. That is why one of the important exercises by curriculum developers is to ensure that textbook publishers have interpreted

the curriculum in a way that enables teachers to adhere to its aspirations as much as possible.

Weinbrenner (1992) identifies three areas of school textbook use: process-orientated, product-orientated and reception-orientated. For the purposes of this research, the focus will be on the latter two.

Product-orientated use views the textbook as a teaching medium and a means of visual communication. Product-orientated textbook research is helpful to curriculum designers and facilitates the provision of more appropriate resources to support the curriculum. This area includes research into gender and cultural sensitivity, and the readability of textbooks (Weinbrenner, 1992, p. 110). In reception-orientated use, textbooks are an "independent socialisation factor in teaching with regard to their effect on teacher and pupil" (p. 23). Thus, textbooks play a key role in the transmission of 'multiple-coded' cultural meaning, about the field of knowledge (what should be learned), and about pedagogy (how the field of knowledge should be taught and learned).

In this regard, Olson (1989) claims that the intention of a textbook is to report meaning that is highly crystallized and singularly interpretable. It is an attempt to construct statements in which the literal meaning is an adequate reflection of the speaker's intention, and which, as a result, preserves their meaning across speakers and situations (p. 237). Other studies have also shown that the use of a textbook in the classroom is linked to a teaching style (Zahorik, 1991 & Merritt, 1992). Amongst some of the conclusions these studies have made is that teachers using a drill (repetition) and practice and rote learning approach depend heavily on the textbook. In contrast, teachers who use an oral and interactive teaching style make little reference to the textbook, and when they did so it was mainly for homework and assessment tasks (Merritt, 1992).

This argument concurs with Remilliard's (2005), who argued that teachers' use of curriculum material has showed that it is dependent on a particular teacher and curriculum in a specific context (p. 212). He argues that there is a complex relation between the teacher and the curriculum. Historically, teachers have relied heavily on

textbooks to reconstruct the contents of classroom practice (Love & Pimm, 1996; Walker, 1976).

However, while there is literature proclaiming the value of textbooks and providing theoretical perspectives on their use, despite the importance attached to textbooks, and the large investments made in their production and purchase, few empirical studies have been reported on the use of textbooks in class situations and their mediation by teachers, especially in the context of the changing curriculum. The enactment of the curriculum by teachers in their pedagogic setting is to a certain extent an indication of their understanding of the intended curriculum. The following discussion of both regulative and instructional discourses of Bernstein (1990) endeavours to provide a technical explanation for the tensions that exist in a pedagogic discourse.

The framework for understanding the implications of the hidden curriculum are clearly explained by Bernstein's (1990) concepts of pedagogic discourse, namely regulative discourse (RD) and instructional discourse (ID). Whereas, RD, according to Morais and Miranda (1996) refers to 'the discourse of order that translates the dominant values of society and regulates the form of how knowledge is transmitted', ID 'is a discourse of competence which refers to what is transmitted' (p. 603).These concepts are used because framing, used as one of the theoretical lenses for this study, 'can be weaker or stronger at the levels of both RD and ID' (, p. 603). What this means is that the teacher can have minimal control of what goes on in a pedagogic setting. In addition, the fact that 'the two discourses can be incorporated in such a way that RD always dominates ID' (Morais, 2002). It is always the dominant values of the society that determine what forms the pedagogic context, and to what extent. Evaluative rules are about what 'counts as valid acquisition of the instructional and regulative texts' (Singh, 2002, p. 573). It constitutes specific pedagogic practices. This is where ideals of pedagogical practices like assessments play out. Therefore, a pedagogic discourse is transmitted through a specific code that integrates specialised contexts (e.g. mathematics classroom) and the selection and production of appropriate texts to these contexts. The *recognition rules* create the means to distinguish between contexts, and therefore to 'recognise the specificity which constitutes a context and the *realisation rules* regulate the creation and

production of the specialised relations within the context' (Morais et al., 1992, p. 248). In order to produce legitimate text, learners should have acquired the recognition and realisation rules. This becomes more evident in the evaluative practices of teachers in a pedagogical setting. This then takes the discussion to the concept of assessment as one of the important aspects of the framework of this study.

Assessment

Classroom instruction has always been significantly influenced by teachers' views on the nature of mathematics teaching and on the nature of assessments teachers use. Such views on mathematics and assessment are in several ways at odds with the notions in national curricula and policies, both implicit and explicit (Naidoo & Parker, 2005a, 2005b). However, in an ideal educational setting assessment practices should promote teaching, and vice versa, in order to effectively promote learning (Vanderyar & Killien, 2003).

Meaningful assessment tasks allow learners to contribute to their learning (Vanderyar & Killien, 2003). This is influenced by several factors, such as teacher's knowledge of content, knowledge of learners, goal of the task, beliefs about mathematics, and instructional orientation (whether it is set to promote recognition or realization rules or both) (Chapman, 2013). Furthermore, for an assessment task to be meaningful, teachers need to have an understanding of how to select and develop tasks that promote learners' understanding of mathematics and support mathematical thinking. To do this, a teacher must understand where (on the cognitive scale) the emphasis in the task should be placed, both as a matter of policy and for what makes sense in the teaching of mathematics in the pedagogical setting. In doing all this, the teacher needs to be aware of his/her learners' abilities, interests and most importantly their experiences (which include their social background).

In the context of a curriculum that has seen major changes in formats and purposes of assessments, the relationship between views on the nature of mathematics teaching and the nature of assessments teachers use calls for further inquiry, because alignment or

conflict between both will influence the likelihood of change in classroom practice. Liljedahl (2008) argued that such "conflicts arise from teacher's espoused beliefs, intended practice, and actual practice" (p. 38). That is why, in the South African context, Webb and Webb (2004) noted that educational and social constructs that are impediments to the transformation of espoused beliefs into improved classroom practice need to be investigated. However, the focus of this study is to see how the assessment practices of the teachers involved tells us about their espoused beliefs, which will clarify their understanding about the curriculum change in the South African context.

Furthermore, in mathematics, tasks are central to learning. For example, they can ''provide the stimulus for students to think about particular concepts and procedures, their connections with other mathematical ideas, and their applications to real-world contexts'' (National Council of Teachers of Mathematics [NCTM], 1989, p. 24). However, tasks as tool for learning have no life of their own. It is the teacher and learners who give them life based on how they are interpreted and enacted in the classroom. The teacher is critical in shaping the task and directing learners' so that they have opportunities to engage meaningfully in mathematics through these tasks. For instance, a teacher could treat a task of high cognitive demand as a low level one or vice versa. There are several factors that could influence this; for example, the teacher's knowledge of content, knowledge of learners (their capabilities, focus levels, social background etc), goal of the task, instructional orientation, and beliefs about mathematics. In particular, the understanding of the teachers' mathematical-task significance for teaching is likely to be the determining factor in how they will treat those tasks.

The CAPS document aligns teachers' assessments to the use of alternative (from traditional forms) assessments. It does this by stipulating that such assessments be given 25% weighting in the term 1 recordable marks of learners (DOE, 2010). Examples of assessments of that nature are projects and investigations. Classifying assessments like projects and investigations under 'formal assessments', CAPS stipulates that:

> Formal assessments provide teachers with a systematic way of evaluating how well learners are progressing in a grade and/or in a particular subject. Examples

> of formal assessments include tests, examinations, practical tasks, projects, oral presentations, demonstrations, performances, etc. Formal assessment tasks form part of a year-long formal Programme of Assessment in each grade and subject (p. 53).

Significant weighting given to alternative assessment methods in the finalization of continuous assessment marks underscores the fact that alternatives to written examinations are not just options, but requirements (DOE, 2010). However, whether the aspirations of this curriculum are realized or not depends on the instructional and assessment practices that are generally influenced by teachers' understanding, which informs their practices (Brown, 2003). It is the primary factor in determining what and how students are learning, and that there may sometimes be a disjuncture between teachers' conceptions about assessments and assessment practices espoused at the regulative level of curriculum. Using the work of Vandeyar and Killen (2007), Krishnanair and Christiansen (2013) highlighted that 'fundamental changes in assessment practices are to be undertaken from a perspective that acknowledges the existence of teachers' current conceptions about assessments' (p. 256). If a curriculum intervention will not recognise and actually manage the transition of assessment practices of teachers in their classrooms, it has the potential to be misunderstood and so not used as an effective teaching and learning tool. Consequently, the assumption of this study is that teachers' approach to assessment tasks in CAPS is almost mechanical in that it does not take into consideration the lack of knowledge and skill by teachers to analyze evaluative responses of learners' conceptual understanding and procedural responses which, according to the CAPS document, claims about 90% of an assessment task. Therefore, if teachers' assessment practices cannot promote these two major cognitive competencies, it does not matter how explanatory the regulative discourse is; teachers will still fail to play a meaningful role in the curriculum change.

Social Contexts and Teachers Curriculum Understanding

Although it was predictable how the South African curriculum interventions would affect the knowledge, pedagogy and assessment, not all contexts responded to such

change the same way. What man end up learning depends on the social location which have nothing to do with our 'innate' mental capacities (Bernstein 1996). In order "to gain consciousness, to become a usable mind, the human brain needs experience, and language acts as a uniquely effective, immensely supple means of construing experience by acts of meaning" (Halliday & Matthiessen, 1999 in Hassan, 2002, p.538). Therefore, learning is achieved through the mind that is socially fashioned by means of semiotic mediation (sign system which in the main includes language).

Hassan's (2002) study focused on how mothers of different social background constrain or enable learning in their children's education. He concluded, among others, that 'the edifice of all learning is founded on interpersonal relations'.... meaning 'all functions in the 'child's tongue' are relational functions. And therefore, teachers need an understanding of how the social background of their learners may affect or enhance learning. One of the findings in Naidoo's (2009) work comparing disadvantaged and advantaged schools is that, 'the historically disadvantaged schools are not able to provide learners with opportunities to learn high level knowledge and skills...' (p. 5). This is not a surprising finding in that disadvantaged schools are located in disadvantaged communities which inherently have a limited semiotic power compared to their counterparts in the advantaged communities.

There are many other research findings that have been recorded about learners' acquisition of knowledge, social class and schools' social context (Morais & Miranda, 1996; Krishnanair and Christiansen, 2013; Dunne and Gazeley, 2008; Hasan 2002). Some record that teachers from middle-class schools generally make their evaluative criteria more explicit than teachers from the working class schools (Morais & Miranda, 1992). This is mainly encouraged by the fact learners from middle-class families are, to a large extent, orientated to elaborated code where there is no limit to sources of knowledge and learning resources. On the other hand, the working class learners are, in the main, orientated to the restricted code – an environment characterized by the lack of resources which tends to inhibit learning, such as the lack of education in their households. It can be further argued that middle-class learners acquire the recognition and realization rules for assessing context in higher degree than working-class students'

(Morais & Miranda, 1992, p. 622). This is consistent with the elaborated and restricted codes' argument above in that the former is encouraged by the availability of resources whilst the latter is as a result of the lack thereof.

This is the reason why educators and those involved in curriculum (development) and pedagogy needs to realize the fact that schools (as centres of qualitative mind change) do not exist in isolation. They exist in cultural settings which, knowingly or unknowingly, influence (sometimes to a great extent) what goes on in school pedagogy. If learning was simply a matter of remotely learning what is taught, teachers would have no business seeking to understand how learning takes place. As argued by Hasan (2002) learning how to relate to persons is thus an earlier and essential condition for all kinds of learning. Furthermore, 'all higher [*mental*] functions [*in the child*] originate as actual relations between human individuals' (Vygotsky, 1978, p. 57). And thus, the knowledge that a learner brings into a pedagogical setting is important for what is to be taught and how. The teacher needs to know what forms of knowledge the learner brings into a pedagogical setting. Although, schools and teachers have 'obligations' they have to meet about teaching, teachers need to be aware of the many factors that are responsible to promote or hinder the child's learning such as the social background of the child. This will help them understand what sort of common knowledge (and ways of mediation that children are exposed to) to expect from their learners and how best they can use (other than just rejecting or accepting) these to promote learning in a pedagogical setting. What Vygotsky (1978) said is true that, any learning the child encounters in school has a previous history.

Therefore, there are various and contesting views about the level of involvement of the teacher in the learning of the child. For instance, some argue that cognitive change (learning) entails the move from familiar content and form through the routes of: *familiar content and unfamiliar form (theorizing) and unfamiliar content and familiar form (memorizing the facts about the unknown* which some refer to as semiotic mediation (Craig, 2001)[1]. On the other hand, the concept of 'scaffolding' – entailing the

[1] According to Craig (2001), the level of learning is where one is conscious of learning or knowing – knowing to know. This is the awareness of one's capabilities – being able to recognize and acknowledge the familiar content and form and also the unfamiliar

process of guiding learning indicates that man has (1) 'structural mental capacity – our given innate mental power' and (2) functional mental capacity – 'the capacity and ability to know, to learn and adapt to new situations' (p.39). Furthermore, the concept of 'Zone of Proximal Development' (ZPD) is seen by Vygotsky as a gap that exists between what a child can do on his own and what he can do with the help of others (adults and or peers). The help of others enables the smooth transition of a child from the familiar form and content to the unfamiliar form and content through semiotic mediation[2] (Craig, 2001). In order to close this gap (the ZPD), an action in the form of appropriate tasks (those that elicit learning) and how these are designed is important.

From the social constructivist perspective, the level of teacher involvement bears discussion. Craig (2001) argues that when a learner is presented with a particular text of a structured knowledge, such knowledge must not create too big a gap between itself and the child's everyday knowledge. If such a gap is too big, 'learning becomes impossible'. Alternatively, if the gap is too small, learning is unnecessary' (Craig, 2001 p.39). Educators and those involved in curriculum (development) and pedagogy needs to be aware of the extent of their involvement in the learning of the child. They should know when their involvement begins to hinder learning in a pedagogic setting. Teachers and curriculum practitioners outside the pedagogic setting must be able to determine as to when is teacher's intervention in the learning environment begins to escalate that it takes away the responsibility of learning from the child or too little that it demotivates the child from continuing with the process of learning. CAPS (2010) declares one of its principles as 'encouraging an active and critical approach to learning, rather than rote and uncritical learning of given truths' (p. 4).

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content and form. He argues that in order for one to realize and actually transcend from the familiar into the unfamiliar, s/he needs to 'act'. His/her action will enable him/her to discover the limits of the familiar and prompt the person to 'want to learn'. But if a person is not aware of what s/he does not know, s/he may not be 'motivated to learn'. And also if a person is continually exposed to the familiar, s/he may not see the need to actively engage in the pedagogic setting towards the unfamiliar.

[2] Semiotic mediation' is an intentional scaffolding of task (Craig, 2001) that is intended to change the cognitive qualities of the subject (a child).

Therefore, tasks and pedagogic contexts should be defined accurately and teachers must ensure (within their powers) that these present an enabling contexts for learning. If schools, and thus teachers, continue to ignore the effects of socio-economic background of learners, they will continue to encourage the perpetual effects of social inequalities (Hoadley, 2007). Besides, teachers themselves are not immune to social class factors, as such they will always engage with pedagogical contexts in a way that depicts their social class allegiance. Therefore, unless policy-makers take into account teachers' understanding during curriculum change, such change may not be effective in that it will not be able to talk to the aspirations of both the regulative and institutional discourses.

Conclusion

It has been argued above that curriculum change is an ever present phenomenon and cannot be avoided. South Africa is not immune to global changes and has experienced four curriculum changes in about 18 years. However, these local changes in have been dramatic in that the three core aspects of any intervention, curriculum, knowledge, and pedagogy, have been grossly underplayed. Thus, changes have been in the extreme in these areas. The first intervention after the advent of democracy showed a very weak knowledge structure. It was weakly classified in that the boundaries between the everyday knowledge and school knowledge was significantly blurred resulting in major schooling concerns from the wider community. The framing was also weak because teachers enjoyed autonomy in how they organised their pedagogical settings and were not dictated to by the regulative narrative. But when it came to the instructional discourse the control of teachers was significantly weakened, whilst learners were empowered to take responsibility for their learning. And so, these fundamental changes about the views of knowledge affected pedagogical practices such as assessment

Furthermore, as was also argued above, what these changes did not sufficiently consider is that not all contexts respond in the same way to changes. In all the interventions, there were unintended consequences or the implications of a hidden curriculum. It has been argued that even the most well-intentioned instructional reforms can advantage the students who are 'best positioned' to reap the benefits whilst disadvantaging others. The

issue of social class and social contexts of schools in South Africa is completely disregarded by the current intervention, as was the case with the previous ones. As a result, it has been argued that unless teachers' understanding of these changes in curriculum are understood and taken into consideration, all curriculum interventions will fail to achieve the aspirations of the regulative, or such change may be seen as an attempt of perpetuating social inequalities.

CHAPTER 3

Methodology

Introduction

This research used the approach of a qualitative case study intending to explore teachers' understanding of curriculum change from National Curriculum Statement (NCS) to Curriculum and Assessment Policy Statement (CAPS) in the teaching of grade 8 Maths. Qualitative research methodologies assume that realities are socially constructed by individuals and society (Smit, 2001, p. 56). They are concerned with understanding social phenomena from participants' perspectives (McMillan & Schumacher, (2006). Qualitative because it relies mainly on the data that is in the form of words in the pursuit of meaning of human action (Badenhorst, 2010). The case studies took the form of interviewing teachers through semi-structured interviews. This was manageable and achievable and also an environment that is familiar to the researcher as a former teacher at this level. It was believed that each case would provide rich insights into teachers' understanding in the context of curriculum change (Rule & John, 2011). It is argued that when a few cases are studied in-depth, they yield many results about the topic depending on the appropriate site selection, comprehensive sampling, and varied selection (Patton, 2002 in McMillan & Schumacher). The idea of analysing learners' workbooks was meant for triangulation, and to accentuate understanding of the data from teachers semi-structured interviews. The framework for analysing the data was adopted from Bernstein's (1996) triple message system, which is knowledge, pedagogy and assessment. Policy shows that the emphasis is now mainly on curriculum and assessment, and appears to be focusing less on pedagogical issues. In the discussion that follows, the sampling, data collection techniques and data analysis framework are explained in detail, as are issues of rigour, and the limitations of the study.

Sample

A distinguishing characteristic of qualitative research is that behaviour is studied as it occurs naturally (McMillan & Schumacher, 2006). In this regard, the study selected two

schools of varied social contexts – one from the former model C schools and the other from the township schools around Gauteng. In each school, two grade 8 Maths teachers were selected for semi-structured interviews. It is said that the strength and the precision, validity, and the stability of the findings of a study is enhanced when more sites are included for investigation (Miles & Huberman, 1994). However, this study was limited to the two schools but conducted an extensive investigation by looking at not only one but two teachers' views on curriculum change, in each school.

In spite of being located approximately 15 km apart, the schools chosen varied considerably in terms of the conditions under which they functioned. The intention was to provide possible answer(s) for the research question which seeks to explore the effect of social context of learners on the teachers' understanding of curriculum change.

The decision to focus on two teachers in each school stems from the fact that the study was interested in exploring and understanding teachers' insights into curriculum change in general, and in their practice in the teaching of grade 8 Maths in the transition between NCS and CAPS. In this study, teachers' understanding entails the beliefs (thoughts, feelings and experiences) that teachers have about their discourse, views, beliefs, and conceptions about curriculum change in the context of curriculum change. In order to get reasonable insights into teachers' understanding, an in-depth investigation was necessary, and involved understanding not only what the teacher said, but also the environment or surroundings in which this happened. All of these factors were important to this research study.

Because of the case study approach, the research used the function of 'thick description' of what the teachers said (during the semi-structured interviews) that they understood about CAPS, and how their understanding affected their current practice. 'Thick description' here entails the complete, literal description of the socio-economic environment of the setting of the participant being investigated (Merriam, 2001).

Data Collection

The collection of data was done using the instrument of semi-structured interviews with teachers and through analysis of learners' work and curriculum policy documents such as CAPS Document (DOE, 2011), Review Final Report on NCS (DOE, 2009) and Review Report on C2005 (DOE, 2000). The semi-structured interviews were used to elicit responses from teachers about their thoughts, feelings and experiences around curriculum change. The semi-structured interviews were meant to provide the primary data for the study, and learners' workbooks the secondary data; the workbooks were also used for triangulation purposes. Each teacher (in the group of four) was asked to provide six samples of learners' workbooks – two from each of the: poor, average, and above-average performing groups. Although interviews were conducted in one day in each school, each teacher was interviewed separately.

It is well documented that historically disadvantaged schools are not able to provide learners with opportunities to learn high level knowledge and skills (Hoadley, 2008; Dunne & Gazeley, 2008; Bodovski 2010; Naidoo, 2009).The choice of schools such that one is from the township and the other from the former model C schools made in order to determine if these two contexts shape teachers' understanding of curriculum change, and therefore their practice, in any particular way and whether the responses were likely to answer the study's research questions.

Interviews

As mentioned earlier, the study explored what the teachers said they understood about the curriculum change in the teaching of grade 8 Maths, using semi-structured interviews. Semi-structured interviews because questions would have been prepared before-hand, with premeditated and pre-planned interview interventions (Dillon, 1990). The main part of answering the critical research question of this study: *What is the grade 8 Maths teachers' understanding of curriculum change from National Curriculum Statement to Curriculum and Assessment Policy Statement;* was expected to be

indirectly asked by organising interview questions in a way that addressed the main elements of the framework of this study: knowledge, pedagogy, and assessment.

Pilot interviews were conducted using different teachers from other schools – one from a township school nearby the targeted township school, and another from a former model C school also not too far from the targeted former model C school. This was done in order to assess issues such as the length of the interview, clarity of questions, and the way these questions were asked by the researcher, and also for the researcher to become aware of what could or could not be expected from each question. The pilot interviews helped the researcher strengthen the design of the original instrument.

Interview Questions

The studies conducted by Krishnannair and Christiansen (2013) 'Assessment Alternatives: Compliance versus Custom'; Devika Naidoo (2010); 'Understanding Teachers' Perceptions of Integrating Subjects into Learning Areas'; and Morais et al. (1992) 'Recognition and Realisation Rules in Acquiring School Science - the Contribution of Pedagogy and Social Background of Students', were all helpful in enabling me to formulate the interview questions. These studies were examined because they look at teachers' pedagogical practices regarding assessment (Krishnannair & Christiansen, 2013), teachers' perceptions (Naidoo, 2010), and the effects of social contexts of schools (Morais, et al., 1992) all within the context of curriculum change.

In their 2013 study, Krishnannair and Christiansen (2013) deal with the conceptualization and the practice of alternative assessments in the context of general assessment practices in Mathematics. It argues that teachers engage in pedagogical practice as a matter of merely embracing the regulative discursive demands, rather than making a concerted effort to embrace the principles of educational reforms. This helped in the formulation of interview questions about teachers' understanding on assessment. The study of Morais et al (1992) investigated the sociological processes in learning and transmission in both the family and school. Part of their main conclusion entails that there is a strong relation between social context, cognitive development, and science

achievement of the learner. As a result, this study was useful in formulating the interview questions related to the social background of learners and the social context of schools in the understanding of curriculum change by teachers. Lastly, Naidoo (2010) deals with teacher's thinking, which provides insights into their theories, assumptions, and perceptions that inform their practices. Her study was carried out in three socio-economical contexts that covered the elite, middle and working classes. This correlates with this study since it is also focused on the understanding of curriculum change by teachers of socially varied contexts; here, only on the latter two contexts.

Although each participant was interviewed in depth, the approach of questioning was kept simple in that a deliberate effort was made to craft the questions using the interviewee's discourse rather than the language of the theoretical community (Mishler, 1986; Briggs, 1986) (see Appendix 1).

Learners' Work Analysis

In order to strengthen (triangulate) the description of what the interview data presented, the study then focused on the workbooks of learners of the same teachers. The mathematical concept that was going to be the area of focus was going to depend on the content covered according to the prescription of the curriculum document, Mathematics CAPS (DOE, 2011) at the time of the research. As a result, the study focused on tasks around the mathematical concept of *Algebraic Expressions and Equations* (CAPS, 2011, p.118). Using the model implemented by Arbaugh and Brown (2005), the study examined the relationships between tasks as they appear in the (1) official/curricular domain/material or textbooks, (2) as set up by teachers, and (3) as responded to or implemented by learners. Learner's work analysis was performed immediately after the interviews of both teachers in each school. A coding to do this was developed using ideas informed by the Levels of Cognitive Demand (LCD) from Smith and Stein (1998) [see Appendix 6].

The study intended to determine to what degree the task encouraged lower and higher cognitive demands. A lower level of cognitive demands in each task domain intended to

determine whether the task was limited to memorization or extended to the use of procedure, without necessarily connecting to any meaning. Memorization here entailed the reproduction of previously learned facts, rules, formulas, and definitions. The higher levels of cognitive demands in each task domain, on the other hand, looked at mathematical procedures which have a connection to meaning and whether the task demands an understanding of the nature of mathematical concepts, processes and or relationships that exist within and across the tasks. It is argued that tasks that ask students to perform a memorized procedure in a routine manner lead to one type of opportunity for student thinking; tasks that require students to think conceptually and that stimulate students to make connections lead to a different set of opportunities for student thinking (Stein & Smith, 1998).

Furthermore, the task analysis was an attempt to find out if the task, and learners' responses to it, showed any evidence of whether the task was promoting recognition rules, or realization rules, or both. The study intended to use this thinking to argue that if learners, in their achievements, appeared to be limited only to *recognition rules* (the lower level of cognitive demand), the assessment task by the teacher did not encourage higher cognitive competence as an inherent principle of CAPS. The study also intended to argue that if learners show *realization rule*s (at a higher level of cognitive demand), the assessment task encouraged higher cognitive competence, thus complying with the prescripts of the curriculum, CAPS. However, the study could not use this approach to analyse learners' work. The reason was two-fold: firstly, teachers did not develop the tasks for the learners on their own but they were compelled by the prescribed curriculum to use particular tasks; secondly, teachers used formative feedback that enabled learners (not teachers) to mark their own work.

Data analysis

The analysis of the study was based on the principles of grounded theory as explained by Scott & Morrison (2007). They argue that in qualitative research, grounded theory is about a good narrative or literal description of data collected, the main characteristic being the generation of themes or categories from data collected. In this regard, the

study used the vertical analysis approach by analysing interview data one-by-one, highlighting important points of data as it further compared it to the 'voice of the learner' from the learners' work books. This was done in order to have an in-depth understanding of what each teacher understood about the change in curriculum. Furthermore, strategies such as narrative paraphrasing and summarising were used in an attempt to reduce the bulk without losing the information obtainable in the qualitative data. It is epistemologically correct to do all the vertical processing before engaging at the level of horizontal processing.

Using horizontal processing, some aspects of interviews and learners' work were excluded, whilst some were retained to determine the similarities and differences of the teachers' understanding of curriculum change and other issues of interest to the study. This was where the identification and showing of recurring subject matter in the data took place. This approach helped the researcher to focus on implicit or explicit understandings, meanings, interpretations and perceptions.

However, analysis was not limited to this level. The study went deeper and analysed, interpreted, and located what was discovered in the data within the theoretical framework of curriculum as a field of study. As a result, data was categorised into the pre-determined themes of knowledge, pedagogy, and assessment. In order to do this coherently, the use of Bernstein's (1996) concept of classification and framing were used as lenses through which the data could be examined and seen to belong to each of the themes mentioned above. The schools' social contexts were used both as a background for analysing interview data, and as an important consideration in answering sub-question number 2 of the study. At this stage of analysis, data developed sub-themes that were used to answer the research questions.

Rigour

Without rigour, research is worthless, becomes fiction, and loses its utility (Morse et al., 2002). Hence, a great deal of attention was applied to reliability and validity in this research.

In order to avoid the transmission of information from one participant to the other in one school, the interviews were conducted on the same day on a back-to-back basis.

The way to achieve validity in qualitative research is obviously different than that in quantitative research. Validity means the extent to which a research finding is what it claims to be (Govender, 2008), and whether the research tools that were planned to be used (interviews and task analysis in case of this study) actually captured what they were supposed to capture (Wellington, in Opie, 2004). In this regard, the study ensured that the types of questions used in the interviews were simplified, direct, free of ambiguity, and addressed the critical questions of this research. As it appears from both the research questions and the field (interview) questions, the emphasis is on Bernstein's three message systems, that is knowledge, pedagogy, and assessment. Furthermore, piloting interview questions were conducted with 2 teachers of similar contexts of the study, and this arguably resulted in stronger interview questions.

In organizing the interview settings, measures were considered to ensure that there was as little interruptions during the interviews as possible. And this was made possible through proper planning together with both the participants rather than planning for them. Validity is also about acknowledging the fact that the researcher and his participants creates their own reality that they understand. Qualitative research methodologies assume that realities are socially constructed by individuals and society (Govender, 2008). The study will argue that teachers' understanding of curriculum change is socially constructed: they embrace varied value-system; their engagement by authorities in the change process; their experiences with the curriculum, teaching and or qualifications etc.

Maxwell (1997) argues that the issue of validity in qualitative research is also strengthened by the way in which the collected data is analysed and presented. In this regard, he cites five levels of validity and their corresponding understandings: descriptive validity, interpretive validity, theoretical validity, generalizability, and evaluative validity. In this study, the researcher adopted, in the main, the first three

levels. Maxwell (1997) states that these indicate the depth, and thus the rigour of the study, rather than each being a study on its own. The study's vertical and horizontal approaches in data analysis followed the descriptive and interpretive validity respectively. Theoretical validity was increased when every piece of data was analysed against sound theoretical literature relevant to the field to the study.

Ethics

The participants were assured of confidentiality, in writing, during the first informal meeting. In that meeting, each teacher (separately) was presented with a letter of consent to sign. To gain their confidence, they were also shown the approval letter from the Gauteng Department of Education which permitted the researcher to conduct the study in their respective schools. The researcher also brought to participants' attention that their real names would not be published in the study in order to protect their views and identities.

It was imperative for the researcher to be prudent when using instruments like recorders during interviews. This was done to prevent and preserve distraction and originality of participants respectively. Again, the participants were made aware of the use of this device beforehand and this was clearly elaborated upon in the letter of consent that the participants signed. Regarding the review of learners' workbooks, the study also administered forms to obtain parental consent for their children's participation in the study.

CHAPTER 4

Presentation of Data

Introduction

This section focuses on the findings of the study from a set of interviews of the four teachers who were involved in it. I will discuss firstly the two teachers from the former model C school before turning to the other set of two teachers from township schools. Each interview will be discussed together with the set of learners' workbooks received from that teacher. The location of the two schools is about 15 kilometers apart. The township school is one of the biggest in the township in the eastern part of Gauteng Province. The classroom enrolment didn't show much difference as each school boasted an average of 36-39 learners per teacher.

The discussion focused on teachers' understanding of curriculum change from NCS to CAPS in their teaching of Mathematics, using Bernstein's three message system: knowledge, pedagogy and assessment. It looked at whether the social background of each school helps or constrains each teacher's understanding of curriculum change.

School 1

Nishen's Interview Description

Nishen is an Indian female teacher in the former model C school located 3-4 kilometers from the centre of Kempton Park town in Gauteng. Nishen had 8 years of teaching Maths at grade 8 level and 3 of those in the researched school. She was an English first language speaker.

Knowledge

Firstly, in relation to the nature of knowledge, Nishen suggested that the curriculum takes everyday knowledge into account in the teaching of Mathematics:

> I feel..... this curriculum emphasises that learners have a lot of general knowledge, a lot of broad knowledge, and not necessarily something that I can only teach in class, but they must be able to pick up from everywhere, from TV, from any programs, anything that— (Nishen, Line 29-33)

Nishen acknowledged the role of everyday knowledge (from the internet, TV, and other sources) and of specialized subject knowledge. She refers to 'general knowledge and broad knowledge' and 'something that I can only teach in class' to indicate different types of knowledge in the curriculum.

Furthermore, there was evidence of understanding the concept of integration of knowledge which is one principle that underpins CAPS:

> But what I noticed has changed is that the linking of Maths to another learning area, that has fallen away. Previously I could link a topic in Maths with something in technology, with something there that they are doing in social science with regard to Maths, scale distance, measurement, kilometres and map-works and similar. But now that has fallen away, so I don't really refer to that, integration of learning areas. (Nishen, Line 136-132)

Nishen did not do any integration of Maths with other subjects because she believed the curriculum does not encouraging it in any way. However, when asked if the integration of Mathematics with other subjects is a good thing for her, the teacher responded by affirming that it is a good thing and that she believed in teaching Maths by integrating it with other subjects.

> It's a good thing, because Maths is related to so many other fields. You need Maths in so many other things. Even if you are baking, the measurements, the recipes, all is Maths. So I would still like it to be integrated with other subjects,

> so the child knows that you're not doing Maths in isolation, but Maths is universal, you need it for everything. (Nishen, Line 137-141)

However, when one looks at this teacher's learners' workbooks – the way the tasks were set and given to the learners - there appears to be no evidence of integration of Maths with other subjects, or even everyday knowledge with school knowledge. The learner activities (as they appear in the learners' workbooks) strictly use Maths language without any effort to integrate this with any other language, subject or knowledge. The teachers' instructions in the learners' work were characterised by statements like:
'Complete these flow diagrams'
'Substitute the values for a, b and c into the expression below if....'
'Write down whether these expressions are monomial, binomial or trinomial'

When one considers what transpired during the interview, the teacher may have liked the concept of integration as an important part of teaching maths. But the other evidence collected (learners' workbooks) indicates that this is not what transpired when this teacher practically engaged with the teaching of this subject. The reasons for this may have emanated from the fact that the new curriculum compels teachers to strictly follow the examples set by the syllabus and textbooks.

> But after every section that we do (teach), and we follow the text book just like the examples, the standard of the examples that they do you can't use just like this, because if this is a textbook written for the entire country. (Nishen, Line 238-241)

She further believed that Mathematics can only be taught effectively when fundamentals of certain knowledge are assumed to be in place, without which teaching of certain concepts cannot advance. She believed that the level of complexity should be followed appropriately for the effective teaching of maths concepts. However, to this teacher it was a waste of valuable time to have to teach what is supposed to be in place already.

> With Maths I would say it's like if I teach something, and I know that the child who should have got some knowledge from Grade 7, then I will say "You remember you did this 2D shapes in Grade 7? Now we are not doing 2D shapes,

> we are doing 3D shapes, but it's linking now with 2D shapes….and if the child doesn't have that knowledge, then I can't go and teach Grade 7 work in Grade 8. I will need you to go back and remember something about the topic, so that I can now lead you further into the topic (Nishen, Line 624-632)

Pedagogy

According to this teacher, the informal assessment tasks which include teaching examples like class work and homework, to more formal tasks like tests,are set by other agencies other than the teacher herself, for example the Head of Department (HOD), the syllabus, textbooks, and teacher guides. This was evident when the teacher said 'everything is not left up to us'. This partly suggests that irrespective of how the teacher views the dynamics of her class at any time, she may not be able to make certain decisions of what and how to teach what she views as appropriate at the time. The teacher showed some evidence of being constrained by what is put in place and meant to enhance her teaching by external agencies:

> ...every text book comes with a teacher's guide on-- just say if I'm struggling to teach this section – geometric patterns. In the teacher's guide at the beginning of the section they will tell you how to teach it, what to focus on. .....even though we went for the course a long time ago on CAPS training and things like that, but in every section you just pick up the teacher's guide. (Nishen, Line 472 - 477)

The confidence of the teacher regarding what needs to be done in the classroom and how she relied heavily upon the support system[1] put in place by these external agencies was evident:

> ...and we follow the text book just like the examples, the standard of the examples that they do you can't use just like this, because if this is a textbook written for the entire country... And then this test and assignment, all these assessments are set by the HOD. (Nishen, Line 179-180; 239-241)

Another interesting observation was the fact that the teacher also used a textbook other than the one approved by the school at grade 8. In fact this teacher enjoyed using several

textbooks for the same class. Her reasons for this stemmed from the apparent differing cognitive levels of learners in her class:

> there are just some examples that are not in here, that even in a class I have some very high order thinking learners. (Nishen, Line 504-505).

Furthermore, she relied on textbooks that she is able to eloquently compare between those that were used in NCS and those that she was using at the time of CAPS. The pedagogical practice was mainly dictated by how a particular textbook appealed to a concept at hand, and or the level of her learners' abilities:

> So the previous textbooks, I will say they are good for the examples, but they are not good when it comes to colour and interaction and things like that. If you look at an older textbook it's just-- so just example. So I only go to them for examples. (Nishen, Line 513 - 516)

This is another important observation that forms the solid basis for analysis with regards to the teacher's understanding of her pedagogical practices in the curriculum change.
It appears that, although the teacher praised the new intervention over the previous one, her (subtle) feeling is that the new curriculum is constraining in some ways in terms of her pedagogical practices.

> Because we're teaching from the textbook... Everything that I'm teaching is in here; they are studying from here. (Nishen, Line 265-267)

This is an important assertion for the study in that it depicts the teacher's understanding of curriculum change with regards to the principles that underpin pedagogy.

Interestingly, the teacher also introduced the concept of 'extended opportunity' when she was asked what sort of pedagogical decisions she makes if her learners have not done well in an assessment task. At first, she introduced the term as a school procedure which works as a remedial exercise for learners who have not performed well in a particular assessment task. However, when she was asked to elaborate on the concept, she displayed passion as if she either whole-heartedly embraced the concept or it was her own device.

> It's written here extended opportunity, where the initial test that they wrote, the child performed badly or failed. Then you say, "You know what, I know you can do better than this. So go and study the same section, and we will do the correction and everything for the test. Maybe we can do one of two lessons again. Come back and you can write an extended opportunity and then we'll see what you will get. (Nishen, Line 280-286)

This process of extended opportunity required that at times the teacher had to re-teach a concept in order to render an exercise effective. This observation is critical for the study as it brings to the surface the question of numbers in class in this particular school compared to the one in the township area. It is also important to observe this as it relates to the strength of the boundary between assessment and teaching in the classroom of this teacher. It appears that the boundary is blurred as demanded by the curriculum, especially when it comes to informal assessment (DOE, 2010). However, the curriculum does not elaborate on the relationship between teaching and assessment when it comes to recordable (formal) assessment. Therefore the concept of 'extended opportunity' seems misplaced by the school in its current form.

This teacher also felt that the change of curriculum from OBE, NCS, to CAPS has affected her confidence in the classroom. For her, teachers need to find time to settle in the new curriculum intervention in order to be confident in their classroom practices. However, she accepts that these changes are inevitable and that "you can't stick to your old methods of teaching. So it becomes a bit uncomfortable".

Assessment

The teacher viewed the curriculum as de-emphasizing the mental ability of learners in the learning of Mathematics. The 'excessive' use of the calculator, according to her, deprives learners of the opportunity to exercise their mental abilities as demanded by the subject like mathematics. 'Everything has to be done mentally in mental Maths'. This teacher thinks it is not important to just know the answer in Mathematics without working it out alone and understanding how it was arrived at. However, the observation

made from her learners' work suggested that this is not necessarily what she practised when evaluating the assessment work of her learners. It appeared that she would issue the assessment work (like homework or classwork) to the learners and never have to take these for marking. The strategy she seemingly opted for was to do the corrections together with the learners and the latter would have to do the marking in their own workbooks. As a result of this, the marking would only depict the wrong or the right answers without actually looking at the steps the learners had taken to arrive to the answer. This is contrary to what the teacher said about marking assessment work in mathematics.

> When I'm marking the test obviously I need to look to see how the child was thinking, especially in Maths. Because in Maths you can't just mark right or wrong. There's lot of consistent accuracy and marks like that. (Nishen, Line 355-358)

This may have been caused by the fact that the tasks that were selected for this study fall into the category of informal assessment. Informal assessment is a daily monitoring of learners' progress and is integral to teaching and learning (DOE, 2010). This type of assessment is not formally recorded and this may have caused the teacher not to mark them as she would with formal assessment tasks like tests.

The teacher also showed an understanding of the sequencing of assessment as demanded by the curriculum: "For term one, this is what we have to give, one test, one assignment...." It also appears that the curriculum opens up a space for teachers to give informal tests as much as they like. However, in this case, even these are not set by the teacher but come from the HOD. When asked about the type of assessment the teacher prefers, she indicated that her background plays a role in determining which type of assessment she prefers. She neatly came out in favour of the test because, according to her, it is a true reflection of what the learner knows.

When the following question was posed to the teacher,

> Do you think the views you have about the test match how you mark that particular assessment test, versus marking your investigation and other types of assessment? (Interviewer, Line 338-339)

It appeared that her belief about a test, assignment and investigation influenced how she marked each one of these. For her, marking a test required that the teacher be careful and be able to perceive what the child was trying to write, and not just right or wrong but - marking for consistency and accuracy. But with assignment and investigation, the teacher doesn't believe that these depict the true reflection of learner performance. Her experience had shown her that assignments and investigations generally had higher marks than tests. The reason for this, in her view, was that she could drill for a test by giving learners many informal tests before the formal one, which was not possible with investigations and assignments. The CAPS curriculum document, on the one hand, defines tests as individualised assessment tasks designed for learners to demonstrate their full potential in Mathematics content (DOE, 2010, p 155). Assignments, on the other hand, are explained by the same document as 'more demanding work as any resource material can be used' (p. 155). What this document says about investigation tasks addresses the this teacher's concern in that 'to avoid having to assess work which is not copied without understanding', the teacher must ensure that the gathering of information happens outside, whilst the write-up must take place under, the supervision of the teacher. It was interesting to hear this teacher forming an opinion about these assessment tasks without referring to the policy document, in an attempt to avert her perceptions about them. I believe if probed further, the participant would have provided more data around the notion of 'extended opportunity'.

Social Context and Curriculum Understanding

It was interesting that Nishen used the phrase 'I feel that the emphasis is on the learners being able to work by themselves' in the beginning of her response to the first question of the interview, which was 'what in your opinion appears to be the emphasis of this curriculum in general?' (Appendix 1, Q1). The use of this phrase indicates more about how she felt about the curriculum change than what it really meant for her teaching. She felt that the curriculum, through the design of textbooks, enables the learners to work on their own without the 'heavy' involvement of the teacher. This is important as it relates to the concept of pedagogy as one of the main categories of the study. In this regard, this

helped when looking at 'framing' to determine the level of control by this teacher and learners in this classroom.

Nishen's view of the social background of learners indicated that she did not agree with the generally accepted notion that the fewer the resources, the more difficult learning becomes. Her experience made her believe that the learners who come from better resourced backgrounds tended to be casual about their learning compared to the learners who came from the less resourced backgrounds.

> "...There are many children in my class. You can see they come from well-to-do families, because they come to class, and they sit with their tablets, they want to take notes, they want to take pictures of the day, and I allow them to do that, but those are the ones that do bad..." (Nishen, Line 574 – 578).

Zanele's Interview Description

Zanele is an African female teacher in the same school as Nishen. At the time of this research, Zanele had accumulated about 15 years of teaching experience. However, she had recently been transfered into this school in the previous four months. Besides teaching mathematics in grade 8, she also was teaching other subjects like Mathematics Literacy and Life Orientation at grades 10 and 11 respectively.

Knowledge

When it came to the new curriculum, Zanele described it as structured in a way that enabled easy teaching preparation. Her understanding of the new curriculum was that both its pacing and sequencing had been standardized: 'I think for me and it provides uniformity more than anything' (Zanele, Line 24 - 25)... 'Yeah, I think you can discuss it. Uniformity more than anything' (Zanele, Line 32 – 33). The other aspect of her

understanding of curriculum knowledge emerged as the integration of knowledge and skills in the teaching of mathematics*;*

> For example in the CAPS, you know you get to teach fractions, and then what should be covered, what are the concepts and skills that the learners must get at the end of the lesson. (Zanele, Line 36 -39)

For her, the concept of integration is only limited to within the subject and does not extend beyond it to include everyday and specialized knowledge *and* Mathematics with other subjects. This was evident when she responded to bullet number two 2 of question 1 of the interview questions (Appendix 1):

> Yes, and the concepts and skills that learners must achieve at the end of day, or at the end of their lesson. (Zanele Line 53 – 54)

However, when one looks at the CAPS Document, it appears that the acquisition of knowledge and skills in Mathematics entails being able to apply it to physical and social problems; using Maths to study related subject matter (other subjects) and hierarchical understanding of mathematics (CAPS, 2010). Zanele also believed that the CAPS curriculum was clear in stipulating the goals for teaching, compared to the NCS curriculum:

> Yeah, I think you can discuss it. Uniformity more than anything. And I think compared to NCS, in NCS you know what were they saying; they were just saying learners need to achieve this at the end of this lesson. They did not specify the ability to teach this content for the kids. For example in the CAPS, you know you get to teach fractions, and then what should be covered, what are the concepts and skills that the learners must get at the end of the lesson. (Zanele, Line 32 -39)

Assessment

Zanele showed a fair amount of understanding of what assessment in Mathematics seeks to achieve, and how, when she spoke about procedural and conceptual knowledge that can be assessed through different types of tasks. She was aware that a (formal) test assesses procedural knowledge whilst an 'open book test' measures conceptual

knowledge. Although she mentioned the word 'homework' when she made a comment on one of her learner's workbooks (Zanele's Learner 1, pg. 4), it was interesting to discover that she would not mention other assessment tasks by name, such as investigations and projects. However, it was apparent that her notion of 'open book test' referred to both investigations and projects. She came across as a person who knew which tasks to use for which purpose, in order to assess certain aspects of the subject.

> Yeah, it depends what I want to assess. For instance, if you want to assess content obviously, just your procedural knowledge, you will choose a test. And then if you want to assess conceptual understanding, you can even ask the learners to use open book test, then there what are you assessing? Conceptual knowledge, you want to see if they really understand what you have taught them. Yes procedural knowledge may be there in the Mathematics, whereas the concept is not there. When you use open book test, all the answers are there, however the standard of assessment is a bit higher because you are assessing conceptual knowledge. (Zanele, Line 108 -117)

When a follow-up question was asked as to her view about investigations, Zanele responded by saying;

> Yeah it's application now of what they were doing in class. They need to apply it and that is a very high level of assessment. (Zanele, Line 123 – 124)

Contrary to Nishen, Zanele did not have an overt problem with investigations and the way they were conducted. The fact that they might not present the teacher with the true reflection of the learners' performance (as it was Nishen's concern); it did not deter her since her understanding was that these types of assessments (investigations and projects) were set as demanding high cognition level in order to compensate the fact that they are 'open book' in their nature. This perspective by Zanele indicated that she understood the purpose of these assessment tasks and and when they are supposed to be used. However, there was a huge change of perspective in this regard when she was asked if she ever used investigations to assess her learners:

> Yes, we use those. They are dictated by this curriculum. (Zanele, Line 188)

In her response, it became apparent that this teacher may not have wholly embraced the idea of investigations (and projects) as part of her assessment strategy. If she ever conducted these types of assessment, it might have been a conforming exercise. When her learners' work (of about a month) was examined, there was also no evidence of these types of assessment.

Furthermore, understanding around the purpose of assessment seemed to relate well with the CAPS requirements of assessment. She seemed to believe in assessing not only low cognitive levels but also high cognitive levels of understanding. However, the sample of learners' work that was used for Zanele showed that in the space of almost a month, there was no evidence that learners were given any assessment that would encourage realization rules of cognition, only recognition rules. The exercises almost encouraged the reproduction of knowledge and the application of basic routine procedures of Mathematics.

In order to make sense of this it was important to look at how others viewed mathematical tasks and teaching. For a mathematical task to be meaningful to learners, it must be able to contribute to their learning (Vanderyar and Killien, 2003). To this end, teachers must also have understanding of how to select and develop tasks that promote learners' understanding of mathematics and support mathematical thinking. Furthermore, the understanding of assessment principles by teachers determines whether the tasks will be fair, reliable and valid[3]. The over-reliance of teachers on prescribed textbooks and other external agencies (like HOD) for the assessment of their learners does not clearly show us if Zanele (and Nishen) has any understanding about assessment principles. Although this was the case, Zanele showed a certain level of understanding when it comes to reliability as one of the principles that needs to be observed when conducting an assessment.

> "And one other thing you have to accommodate all the learners. That's why we use different forms of assessment" (Zanele, Line 154 – 155).

Integration in assessment within the subject and other subjects

When it comes to considering the integration of school and everyday knowledge in assessment, Zanele conceded that it is important. However, she viewed the current intervention as disallowing this and blamed it on uniformity across the board (Zanele, Line 166 -167). It is interesting to observe the turnabout of this teacher regarding the uniformity of the curriculum at this stage of the interview. At the earlier stage of the interview, Zanele praised the uniformity of the curriculum citing the fact that it brought about structure which enabled easy preparation.

Pedagogy

As I turn to the understanding of pedagogy by Zanele, I will start by looking at her response about the training that was provided (by the department of education) to teachers in preparations to get her and the colleagues ready for the new curriculum intervention. She had a contradictory view to Nishen about this. The response she gave was bold and indicated that she was satisfied by the preparation:

> "I think it's fair enough; we were well prepared, because we're prepared in advance. Another thing yes, if you are really serious, you know you take your time also to make sure that you know what's going on before you implement this. So I'd like to say we were prepared well enough" (Zanele, Line 59 -63).

She then quickly made a turn when she related the notion of preparation to time and not necessarily to the quality of training provided. I observed with interest also the fact that Zanele does not voluntarily refer to the extra help that would be provided by the HOD of the subject as constraining as it was with to Nishen from the same school. Instead, Zanele referred to her own efforts to ensure that she understands the intervention. However, she ultimately conceded that the involvement of the HODs in re-training of teachers was important but necessarily no reference was made to constraining and she further introduced the concept of departmental facilitators.

> "Yes, they are. Firstly it starts within the school. If there's someone who is competent in the school, they can assist. But if there's no one, obviously we then involve the facilitators." (Zanele, Line 75 -77)

According to Zanele, the flow of process in terms of teachers getting help in their work - starts with the teachers themselves, then the HOD's involvement and ultimately the departmental facilitators. The escalation of the process whenever help is required almost wholly depends on the teachers themselves. Contrary from Nishen, Zanele did not 'feel' the curriculum is imposed on them and constraining in some way. This kind of feeling may have been caused by the fact that Zanele had experienced all forms of changes in the curriculum in South Africa.

Social Context and Curriculum Understanding

I would like to turn to the view Zanele held regarding teaching learners of various social background. In her articulation, she praised learners from a background such as her school's. She further explained the role of the teacher, learners and even parents in both backgrounds:

> Yeah, I think so. It's a challenge though. You can see that they're doing their part, whereas if I compare the township school and the-- former model C schools. You know the township schools, the learners you know, sometimes you cannot even challenge them because you can see they are not at that level. But when you observe carefully, it's just that they don't do their parts when they get home. I don't know whether there's a lot of things that are going on in their minds or what. And here you can see, the learners they take their work seriously. You give them homework, they will do it. You know they will even come with questions 'Mam, how do you do this one?' There you do the minimum, and they will also do the minimum, and it ends there". (Zanele, Line 283 -294)

What was interesting with this is that she had a particular view about learners from a 'township' background. She feels the learners from this and similar backgrounds cannot be 'challenged', firstly because they are not at 'that level', and secondly because 'they

don’t do their part when they get home’. For this, she indirectly blamed the minimal involvement of parents. This was important information since she also had about five years experience teaching in the township school. However, when she talked about the ‘town’ school learners, she viewed them as serious about their work and very co-operative and eager to do their part: they engaged with their homework and instead of being challenged, they challenged teachers with questions. Whilst these learners could have been praised by this teacher, it was interesting to view some of the comments that she made in some of her learners’ work (see Appendix 7):

This indicates the fundamental deviation of what the teacher says about her learners coming from the ‘town’ background and what she actually does in a pedagogic setting, and warrants further analysis in the following chapters of the study.

Furthermore, her view also contradicts the views of her colleague (Nishen) of the same school, in that Nishen was aware of other dynamics that existed in teaching learners of ‘town’ background. She indicated that even though some learners might have resources (like tablets), it did not necessarily translate to high performance. On the other hand, she continued, learners without such resources were not necessarily ‘bad’.

> There are many children in my class. You can see they come from well-to-do families, because they come to class, and they sit with their tablets, they want to take notes, they want to take pictures of the day, and I allow them to do that, but those are the ones that do bad..... But I feel the ones that are poor or come from poor backgrounds, I think they realise the poverty that they're in, and I continuously tell them the only way that you're going to get out of you poverty,… is if you get education. And I think that's what drives them. (Nishen, Line 574 -592)

School 2

Ayola's Interview Description

Ayola is an African female teacher in the township school who was at a temporary post at the time. She was in her late 20's at the time of the interviews and she was born in another province – KwaZulu-Natal to be particular. She had an overall experience of 3 years, of teaching Maths at grade 8 levels. This information is important for a case study like this since it provides background to the understanding of factors surrounding teacher's articulation of their own understanding on curriculum change.

Knowledge

Looking at how Ayola viewed knowledge, she was frustrated by the fact that this curriculum was not sequenced in a way that makes it easy for them to follow and also the fact that it was complicated for her. There were two reasons according to her that made her view this curriculum as 'ill-sequenced'. Firstly, it was jumping around mathematical concepts:

> They (learners) don't have a mind to look that when you teach them today like x+y. Then you (a teacher) come the following day and say, now let's talk about trigonometry. That's the problem. (Ayola, Line 22 -25)

According to Ayola, this did not help learners to grasp mathematical knowledge, especially because, learners of 'today' have too many things in their minds. The second reason arises from the way district officials set the external formal assessments. They compile one set of mathematical concepts for assessment, when she expects another.

> and they set for them the financial mathematics, which is not even there in the work schedule. (Ayola, Line 26-27)

She further asserted that this lack of sequence results in her being lost in the curriculum and not knowing exactly what she is dealing with at any one time. Furthermore, she

indicated that this kind of sequencing resulted in her learners failing and, 'the blame.... [being] apportioned to her (Line 54). However, the analysis of her learners' workbooks did not show the lack of sequencing of the work taught in that period. Her learners' work was consistent (both in terms of time and content) with the other teachers (one from her school and two from the former model C school) (Ayola's Learners 1-5). This might have been because of the lack of interaction of the teacher with the curriculum documents which clearly spell out the sequencing of the learning content in grade 8 (CAPS, 2010, p. 75 -113). This was also evidently coupled with the lack of understanding as to how mathematical knowledge is (supposed to be) structured. According to Bernstein (1996), mathematics is a horizontal knowledge structure[3] with a strong grammar (that which encourages/discourages the acquisition or transmission of knowledge). This is partly because mathematics and subjects like it measure mostly through objectivity rather than subjectivity, and because of the hierarchical structure of knowledge acquisition. And therefore, if Ayola did not understand the principle underpinning the sequencing as it appears in the curriculum, she would evidently view the content as 'ill-sequenced'.

Pedagogy

Pedagogical practice affects the 'mode of acquisition' (Bernstein, 1996, p. 169). It follows that the type of knowledge to be acquired determines the form of pedagogy that is required to transmit it. For a maths teacher to understand the pedagogy required to transmit content, she must be conversant with the existence of the two types of discourse, horizontal and vertical, and with the recontextualization[5] of the former. Secondly, the teacher must also be aware of the factors that tend to limit the efficiency of recontextualisation, such as space, time, disposition, social relations, and relevance. Furthermore, the implications of the hidden curriculum[6] are clearly explained by Bernstein's (1990) concepts of pedagogic discourse, namely regulative discourse (RD) and instructional discourse (ID) [7] .Therefore, framing[8] can be weaker or stronger at the

[3] Horizontal discourse is typified as 'common-sense knowledge, oral, local, context-dependent and specific, tacit, multi-layered and contradictory across but not within concepts'.

level of both RD and ID (Bernstein, 1990, p. 603). What this means is that the teacher can have minimal control in a pedagogic setting.

At this point Ayola's understanding of her own pedagogic practice, and that demanded by the change in the curriculum, becomes significant. When she compared the two interventions, Ayola was of the view that NCS encouraged groupwork (Line 80), whilst CAPS encouraged individual attention. Her assertion is partly consistent with CAPS, which encourages both groupwork and individual attention (CAPS, 2010, p.5)[9]:

> Comparing to NCS but I'm still young in teaching. NCS was encouraging group work a lot. But this one (CAPS), especially in mathematics, I don't remember working in groups, they must work individually. (Ayola, Line 79 -82)

She also asserted the fact that the new curriculum does not allow learners to take their work home. Again, she could not substantiate this clearly. When she was asked if such an instruction was spelt out anywhere in the curriculum, Ayola tacitly agreed that such an instruction came from the curriculum. However, she appeared unsure as to the source(s) of this instruction. Again, from her learners' books it appeared that she had some activities titled as homework, while others were titled as classwork. This is therefore the basis of the observation that there was little evidence that Ayola ever interacted with the curriculum documents to guide her teaching. In terms of support that enhanced her understanding of the curriculum, Ayola made no mention of either internal or external support, such as her counterparts in the town school. In the entire interview, Ayola did not even mention HOD or school management. She appeared to be grappling on her own with what the curriculum demanded of her. However, she felt that acquainting herself with the curriculum through training and interacting with curriculum documents as inconvenient and time-consuming, and that it would result to a gap 'between her teaching the children and learning the curriculum'.

> They were supposed to give us training that says, we are now changing the way we are teaching. But then, how can I, because it means I am also learning. There will be a gap between my teaching the children and learning the curriculum. I'm teaching this side but I still have to learn. How do you deliver the material to children when you don't know it? So it's time-consuming. I would say it's time-

consuming. That is why I did not finish the syllabus (laughs) I did not finish! Oh my God did I said that! (Ayola, Line 143 – 151)

This lack of understanding of what the curriculum requires also resulted in her over-reliance on textbooks of her choice, not necessarily those that were prescribed by the school and the department. She chose to continue using the same textbooks that she was using in the NCS:

Interviewer: Wonderful. In terms of normal textbooks, what kind of textbooks currently are you using?

Ayola: We're using Platinum.

Interviewer: Platinum?

Ayola: Yeah, Platinum Mathematics. New CAPS books anyway new Platinum book [?] [inaudible]

Interviewer: How did it land into your hand? [Did you?] made the choice amongst many textbooks, or--?

Ayola: Ney, It just came whoever there-- must be kept-- they said what we're going to use [NE], what we must use [NE], use all the same textbooks. [NE] [So I think the decision?] from upstairs. They just thought it was okay because it's the new curriculum, we're going to use it. [NE] [They are mixed up and very complicated. They're not clear. They're just all over the place. Too much notes. You cannot have notes in mathematics. Why do I need notes in Mathematics?

Another example that indicated her distant interaction with the curriculum document emerged when she spoke about whether she was teaching her learners in a group or individually. As indicated above, Ayola did not show any knowledge or understanding as to what was propagated by the curriculum in this regard. She simply asserted her own preference in terms of the teaching style. According to her, she preferred teaching the learners in groups; she reasoned by that learners will be able to help each other. This is partly consistent with the curriculum document. She also divulged that her preferred

teaching style was teaching by repetition (Ayola, Line 214 -214). Her reasoning around this strategy is that the learners she had were not very 'sharp'.

> …If only I had sharp kids, I would not need to repeat myself. But the group of learners I have, I have to repeat myself until I'm satisfied that everyone has understood. It doesn't help to do it once and think everyone understands. I have to do it even if that means I may not finish the syllabus. (Ayola, Line 248 - 253).….I think repetition is number one. (Ayola, Line 268)

For her, this strategy required patience and was meant to accommodate the 'type of learners' (referring to 'struggling' learners). She thought her approach suitable for the type of her learners. She measured the success of her approach by her learners' performance.

> I think they do understand me. If I can take a child who would get, five, and make her get five [Scale of achievement for NCS grades 7-9 which suggests Substantial Achievement (60 – 69 percentage)], in an exam. I think I'm hitting the target. I think I'm hitting the target. I don't know but I think it is so when I look at their responding and stuff like that. When I ask them if they understand me, they say they 'Mam we understand you'. (Ayola, Line 253 -258)

Social Context and Curriculum Understanding

Ayola's views as to whether the social background of learners affected their learning, and her teaching, were interesting. She believed there is a huge difference in the mentality of a child from a squatter camp, and one from a different background. She felt there was a strong influence of the social background on the attitude of the learner and his learning.

> Yeah, I think so. You know what; background plays a very very huge role in the period we find yourself in. It does. A child who comes from the squatter camps, is not the same as the one who comes from another background. The mentality is not the same (Ayola, Line 408 – 412).

According to her, the type of learners she was teaching did not see their future in education because of their surroundings. She believed their counterparts in the suburbs

are always motivated to learn, also because of their surroundings. Ayola viewed this as a barrier to learning that every teacher should be aware of. Her understanding of this was consistent with the concept of inclusivity in the CAPS curriculum document.

> The key to managing inclusivity is ensuring that barriers are identified and addressed by all the relevant support structures within the school community, including teachers. (CAPS, 2010, p. 5)

The *Guidelines for Inclusive Teaching and Learning, 2010* categorise, amongst others, the socio-economic barriers created by learners' social backgrounds. They encourage teachers to be aware of these; to identify, and plan around them. Ayola appeared to have understood this in that she adopted a teaching strategy that seemed consistent with the elimination of these barriers.

Assessment

Ayola could not clearly articulate the assessment requirements of the new curriculum. She could not separate the instructions of the district officials and what was stipulated in the curriculum documents.

> …now there are more tests that need to be conducted in maths, like you'll find this term they have written two tests (from the district) 50, 50 and the exam is 100. (Ayola, Line 93 – 95)

In this instance, the curriculum document clearly spells out that the number of formal tests that should be issued is one per term (CAPS, 2010, p. 155). She could not verify the validity of the two sources of information (the curriculum document and the instructions of the district officials). Instead, she complained that district officials dictated to her about conducting assessment. She viewed the external officials as interfering with her autonomy by not giving her the opportunity to set assessment work consistent with what she taught. Furthermore, she felt it was not a 'good thing' that the exam weighed more than other assessment forms in the new curriculum.

Karuna's Interview Description

Karuna is an African male teacher in the township school and is originally from Zimbabwe. He had a combined experience of around 29 years of teaching. He had been a principal in Zimbabwean primary school for over 10 years. By 2014, he had been in South Africa for more than nine years. He boasted seven years of teaching Mathematics and Life Science in grades 8 and 10-11 respectively. He was an honours graduate from the University of Zimbabwe and was specialised in 'curriculum studies'.

Knowledge

Karuna's knowledge of the curriculum change indicated that he understood some concepts about the curriculum, and what some of these entailed. However, he also as appeared to either neglect or take for granted important tennets of this change. When he was asked question 1 of the interview guide[10], he responded with the following statements:

> The current curriculum in general it focuses on learners doing everything through a set program on their own. (Karuna Line 33-34)
>
> The emphasis is on assessment, so that when the learners are doing the work you find that they when the teacher has given them basic knowledge, the learner can work on his or her own throughout without the assistance of the teacher and by so doing the learner will be developing the mathematical required skills. (Karuna, Lines 43-48)

This showed a fair understanding of the CAPS curriculum as he was aware that the emphasis is on assessment (though he did not have much to say around the question of assessment). His view agreed with the generally accepted one, and also with the curriculum document as it indicates that the curriculum 'stipulates policy on curriculum and assessment in the schooling sector' (CAPS, 2010, p. 3). His view that the curriculum focused on 'learners doing everything through a set program' spoke to the structure of the curriculum. He believed that the structuring of the curriculum did not involve him but was the responsibility of someone 'out there'. Essentially, this meant

that he saw himself only as a teacher, and not as an implementer of the curriculum. He further asserted that this curriculum was adopted from the Cambridge University version of curriculum. As a result of this, he believed that CAPS was a curriculum of higher quality than NCS because the former produced learners that can compete globally (Karuna, Line 70 – 75). His view resonated with one of the principles of CAPS which is concerned with 'providing an education that is comparable in quality, breadth and depth to those of other countries. (CAPS, 2010, p. 5).

It was also interesting to observe that Karuna's understanding of curriculum change with regards to knowledge, relates almost appropriately with the principle of progression in the CAPS document.

> We find that the CAPS one it starts from a little bit simple things and then goes on to challenging things. (Karuna, Line 143 – 145)

This principle entailed that 'content and context of each grade shows progression from simple to complex' (CAPS, 2010, p. 4). The process of learning needs to be hierarchical and follow a simple process of remembering, understanding, applying, analysing, evaluating, and creating to become effective (Krathwohl, 2002)[13]. In order to determine whether Karuna understood the notion of 'from simple to complex' as he claimed, I examined his learners' workbooks (Karuna's Learner 1 to 6). It appears that there is contradictory evidence, which arose from the chronological issuing of mathematical tasks to learners. For instance, one of the tasks given on 25 March 2014 was about substitution in an algebraic expression: $3(c-b) + (b+c)^2$ *where* $b=-2$ *and* $c= 5$. On 7 April 2014, the task was about simplifying an algebraic expression such as $y^2 + y^2$ (Karuna's learner's workbook, p. 18). To this end, it appears that these tasks were given to learners 'from complex to simple' and not 'from simple to complex'. This puts his understanding of the concept into question. When asked whether the notion of 'from simple to complex' is helpful, Karuna showed a strong belief that it is: 'We always have to study from simple to complex'. In essence he may have believed in this notion but did not understand what it meant for a pedagogic context.

Pedagogy

When it came to pedagogy, Karuna's understanding of the curriculum was rather idealistic. He felt that learners could learn 'on their own without the assistance of the teacher' (Line 45-46). What was clear from his understanding was the lack of evidence that learners were learning with limited or no guidance from the teacher. According to him, the teacher's involvement is only important to ensure the existence of the basics, enabling the learner to successfully interact with the knowledge on her own.

His view resonated with the concept of 'weak framing'. It indicated the low degree of teacher control, specifically over the pacing and timing of knowledge to be transmitted and received in a pedagogical relationship (Bernstein, 1996). His reference to learning actually entailed the learner 'developing mathematical required skills' (Line 47-48), (understood by him to be basic skills like addition, subtraction, division, and multiplication) in order to perform mathematical operations. However, literature has various views regarding the involvement of the teacher in the learning of the child. For instance, cognitive change (learning) entails the move from familiar content and form through the routes of: *familiar content and unfamiliar form (theorizing) and unfamiliar content and familiar form (memorizing the facts about the unknown)* which some refer to as semiotic mediation (Craig, 2001, p. 11). On the other hand, the concept of 'scaffolding' –the process of guiding learning - indicates that people have (1) 'structural mental capacity – our given innate mental power' and (2) functional mental capacity – 'the capacity and ability to know, to learn and adapt to new situations' (Craig, p. 39). Furthermore, the concept of 'Zone of Proximal Development' (ZPD) is seen by Vygotsky as a gap that exists between what a child can do on his own, and what he can do with the help of others (adults and or peers). The help of others enables the smooth transition of a child from the familiar form and content to the unfamiliar form and content through semiotic mediation (Craig, 2001). In order to close this gap (the ZPD), an actions in the form of appropriate tasks (those that elicit learning), and how these are designed, are important.

The above constitutes an argument that the teacher's involvement in the learning of the child is necessary from a social constructivist perspective. From Karuna's assertion of how he understood the curriculum, he could not define the level of his involvement in enabling learning of his children in the class. It is also clear from the above that when presenting a learner with a particular text of a structured knowledge, such knowledge must not create too big a gap between itself and the child's everyday knowledge. If it is too big, 'learning becomes impossible'. Alternatively, if the gap is too small, 'learning is unnecessary' (Craig, 2001 p. 39). Educators and those involved in curriculum development and pedagogy need to be aware of the extent of their involvement in the learning of the child, and be cognizant of when their involvement begins to hinder learning in a pedagogic setting. Teachers and curriculum practitioners outside the pedagogic setting must be able to determine when a teacher's intervention in the learning environment escalates to the point that it takes away the responsibility of learning from the child, or assigns too little and demotivates the child from continuing with the process of learning. CAPS (2010) declares one of its principles as 'encouraging an active and critical approach to learning, rather than rote and uncritical learning of given truths' (p. 4). If learning was simply a matter of assimilating what is taught, teachers would have no business seeking to understand how learning takes place. It is the task of teachers to improve on the learning that would happen without their involvement. Tasks and pedagogic contexts should be defined accurately and teachers must ensure (as far as is within their power) that these present an enabling context for learning. The knowledge of a learner and the learning process in a pedagogic setting are both important for what is to be taught and how. However, schools and thus teachers also have 'obligations' to meet about teaching. There are well established bureaucratic dictates that must be dealt with in order to operate successfully in the Zone of Proximal Development.

Therefore, it could be said that Karuna's understanding of teacher's involvement in the learning of the child is limited in that it does not resonate with the aspirations of the curriculum specifically, and with that of literature in general. However, Karuna did not view his understanding of the curriculum as limited; rather that of other teachers (South African teachers). He based his reasoning on two levels. Firstly, he viewed himself and

some of his colleagues from Zimbabwe as well positioned to easily understand the new curriculum as it was (according to his own belief) designed through the University of Cambridge, which was part of the education system in Zimbabwe. Secondly, he believed the period that was taken to train teachers during the introduction of the curriculum in general was very limited.

> CAPS you know, from, you know, our foreign education, this is the type of you see education we went through in the university so when we came here then they (South African teachers) feel that problem, many problems. (Karuna, Line 58 - 61)

Assessment

Karuna believed that assessment is used to 'check the progress of the learner' in terms of understanding the concepts that are being taught (Karuna, Line 187 - 188).

> In any discipline as a teacher we need to check the progress of the learner. Is the learner picking up the concept? They require the concept. Right? And then you undergo what we call continuous assessment. As you cover concepts you must check on the learner. If the learner gets you, what you wish to get. The extent of the subject, the field. Then if, let's say, the learner lacks sufficient knowledge, if you indicated on the assessment when you give them their tasks you find that they are not doing this, they are failing this. It is an indicator which tells that you this concept has not been covered. You go back and repeat it probably vary the method so that. (Karuna, Line 187 – 197)

Karuna demonstrated an understanding of the forms of assessment: tests, examinations, projects, assignments, and investigations, as recommended for mathematics. His view of the tests is that they are designed for information recall. This view slightly agrees with the stipulation of the CAPS document about administering a test. However, Karuna did not mention the fact that tests must accommodate different cognitive levels of learners. Again, his explanation of projects as an example of an assessment form is that they were about the manipulation of skills such as drawing and measurement. What he could not

clearly demonstrate was his understanding of the notion of applying mathematical concepts in real-life situations as stipulated by the CAPS document (p. 156).

Furthermore, he understood it as an integral part of his teaching and also a diagnostic tool. This is consistent with the view that administering meaningful assessment tasks to learners contributes to their learning (Vanderyar & Killien, 2003). He does not only assess in order to allocate marks and for recording purposes. For him, assessment is an 'indicator' of the performance of the child, as well as of areas requiring attention, which can inform his teaching.

> When we mark we do what we call diagnostic analysis. As we are marking we tick down learner's problems that learners are unable to write, learners are unable to subtract big numbers, or learners have a problem with subtracting numbers with a decimal. And after that we go and re-read the area and try to teach around it. (Karuna, Line 248 – 253)

However, there is a lack of evidence of such an understanding in the assessment work of Karuna's learners. Firstly, there was a very occasional interaction of the teacher with learners' workbooks. This was apparent because Karuna barely marked the learners' assessment tasks. Instead he checked whether each learner had his/her work marked by another learner. Even at the times where he made comments like 'incomplete' (Karuna Learner 4, p. 25), 'no H/W', or 'corrections' (Learner 6, p. 3, p. 10), his marking was not of an informative, but more an administrative nature.

He also believed that any assessment must have assessment goals.

> When you as a teacher, when you design as assessment or a test or whatever, it must address certain goals you need the learners to achieve, for example, let's say, in transformation. You look at the learner must be able to plot coordinates. Then the learner must be able to draw, the learner must be able to apply the learned skills into the new situation and come up with a finished product. (Karuna, Line 232 – 238)

This belief, like others, is tainted by lack of evidence that in his learners' workbooks. It did not appear that his assessment of learners was driven by any pedagogic goals, or that such goals were important for his teaching. There was no evidence that showed that these were communicated and discussed with the learners at any stage. There are several factors that could have influenced this. It could have been that such goals were stipulated in the textbook which the teacher used to assign tasks to the learners, or that these goals were not as important as purported in his response.

Social Context and Curriculum Understanding

He believed that learners' background should not be considered as it could work as an excuse for learners to shirk responsibility for their school work.

> If we are to consider our learners' social background then we find that will be a hindrance in education, because the learners have got different backgrounds in which a teacher should not take account of, because some learners will end up not doing their homework because they are at home, they cannot do there and so on, so in a school setting you shouldn't use the learner background because that would be a loophole or a scapegoat. (Karuna, Line 349 – 356)

This indicated that the participant understood the question differently from his counterpart.

Discussion

The findings have indicated that teachers' understandings were impacted by many factors, including how they were prepared for the interventions, the social background of their schools or learners, their educational and teaching background and experience, and how they relate to the curriculum material including textbooks. The discussion that follows will look at how the aforesaid factors enabled the emergence of teachers' understandings of curriculum change by reflecting on issues they raised around knowledge, pedagogy, and assessment, as the main framework of this study.

School 1

The following discussion shows how Nishen and Zanele view knowledge, pedagogy and assessment in different ways.

Knowledge

Integration

Nishen suggested that the curriculum takes everyday knowledge into account in the teaching of Mathematics: She understood the concept of integration of knowledge of everyday and school knowledge and believed that any curriculum should see a value in everyday knowledge. The explanation for her belief could be that she might have had residual ideas from C2005, as a learner.

However, in analysing the data, the study could not find integration in CAPS or in learners' workbooks as a result. There was a contradiction between her view and CAPS, where she practiced integration of everyday and school knowledge of mathematics with other subjects in her teaching, citing the fact that the curriculum did not encourage it. This finding was consistent with the fact that although integration was mentioned in the beginning of the CAPS[4] document as one of its underpinning principles, the study did not detect any evidence of integration of mathematics with other subjects or everyday and school knowledge throughout the investigation. In this regard, Bernstein (1996) argues that there are strong boundaries between school subjects or everyday and school knowledge. Therefore, the curriculum provided a mixed message, encouraging integration while not enabling integration by teachers.

Zanele's view of integration was different to Nishen's: she viewed it as something occurring between knowledge and skills in the teaching of mathematics, in which skills were seen as measurement or data handling, and not necessarily affective and or

[4] According to the CAPS Document, the teaching and learning of Mathematics aims to develop acquisition of specific knowledge and skills necessary for: the study of related subject matter (e.g. other subjects).

psychomotor skills such as self-control and using a mathematical instrument, respectively (Forehand, 2005). The CAPS Document, explained the acquisition of knowledge and skills in mathematics as applying mathematics to physical and social problems; using maths to study related subject matter (other subjects) and hierarchical understanding of mathematics (CAPS, 2010). However, the curriculum was not explicit enough on how teachers were supposed to deal with skills.

Although Nishen explained her omission of integration in practice, Zanele did not explain why the integration of skills was not evident in her learner workbooks. A possible reason could be that the role of the prescribed textbooks in interpreting the curriculum (Remilliard, 2005) was problematic as it did not have integrating activities. Studies (Remilliard, 2005; Sosniak and Stodolsky, 2000; Ball and Cohen, 1996) have shown that mathematics is a study that has long been associated with and driven by textbooks and curriculum material. As a result, efforts to initiate change in mathematics teaching rely heavily on revised textbooks or curriculum (Ball and Cohen, 1996). In this regard, textbooks as curriculum tools, could avoid sending the mixed message if they are to be considered critical instruments of curriculum change.

The department claimed to have encouraged teachers to follow on the examples set by the syllabus and textbooks in order to provide guidelines on how progression could be addressed in the senior phase (CAPS, 2010, p. 11). There could be a mixed message between the department, schools and teacher in relation to the use of textbook. On the one hand they encouraged teachers to follow on the on the examples in textbooks and on the other they did not seem to integrate what Zanele saw as skills.

In this regard, Bernstein's (1971) analysis of integration is informative. For integration to be effective at a high level of abstraction, the three aspects are important; firstly, the subjects must be subordinate to a particular theme, secondly, the boundaries must be blurred between the subjects and thirdly, conceptual integration must involve general principles at a high level of abstraction (Bernstein, 1971). From the findings above, Nishen and Zanele showed to adapt to the approach of the curriculum of strong classification where mathematical knowledge was concerned.*Sequencing and Pacing*

Nishen and Zanele showed noteworthy evidence about the concepts of sequencing and pacing of mathematical knowledge in the curriculum. In the present study, these concepts seemed important in portraying the teachers' understanding of the CAPS curriculum.

Nishen believed mathematics can only be taught effectively when fundamentals of certain knowledge in place: she believed that learner's concept formation in mathematics should be from simple to complex. However, she did not believe it was her responsibility to provide information assumed to be in place. This claim is consistent with sequencing proposed by the curriculum which stated the levels of complexity of the maths concept across the senior phase (Grades 7 to 9).

Zanele's notion of a 'structured curriculum' in both interview data and her learner workbooks indicated that she believed both the pacing and sequencing of CAPS curriculum had been standardized[5]. This view was consistent with the findings both from her colleague in this school and her counterparts in the township school. And so, what she believed the curriculum was aspiring she was able to put it to practice. However, this should be read with caution since the textbook was very instrumental in directing her teaching.

There are similarities between their perspectives on knowledge sequencing to those described by the literature on concept formation (Forehand, 2005; Gamble, 2014; Vygotsky, 1962), which argues that concept formation is gradual and affected by outside stimuli[6]. In order to teach systematic/uncommon sense knowledge to a schoolchild, an understanding of the process of scientific concepts development (Vygotsky, 1962) and Piaget's interaction activity is necessary. The process involves the formation of everyday and scientific concepts through generalization, which is solely dependent on the child's intellectual capabilities. In accordance with this idea, Piaget (1971) sensed

[5] Referring to the fact that the curriculum prompted all teachers to teach the same thing at the same time.

[6] In their work in Vygotsky (1962), Hanfman and Vakar argued that scientific concepts are "absorbed ready-made through a process of understanding and assimilation" (Vygotsky, 1962, p.82). They further looked at the argument that the development of a scientific concept in the child's mind does not differ from the development of concepts in his everyday experiences.

that children construct knowledge actively as they manipulate and interact with their environments.

Pedagogy[7]

Nishen and Zanele held views of pedagogy that differed in some respects and showed similarity in others. Nishen explained that the informal assessment tasks (class work and homework) and more formal tasks (tests) were set by agencies other than herself (for example, the HOD and or the district), and so believed she could not change or add to the prescribed work. This can be explained by the way the prescribed textbooks elaborated[8] content and as a result constrained teachers' autonomy and flexibility. In the same breadth, Nishen viewed textbooks and teachers' guides as helpful for refreshing her training on CAPS. For her, these were better teaching guides than teaching tools (Olson, 1989). This meant that she used textbooks as instruction guides directing her to what needed to be taught, but not necessarily how to teach it.

Contrary to Nishen, Zanele had confidence in her own efforts and the extra help that was provided by textbooks, HOD and the district. She felt she had an option to use other textbooks and sources to guide her teaching. In her comprehensive analysis of teachers' use of curriculum material, Remilliard (2005) showed that it is dependent on a particular teacher and curriculum in a specific context (p. 212). Historically, teachers have relied heavily on textbooks to reconstruct the content of classroom practice (Love & Pimm, 1996; Walker, 1976). Zanele's approach to textbook use could be defined as interpretative because she used textbooks other than the one prescribed (Remilliard, 2005).

It can be seen that their use of textbooks was similar in that they would both choose a textbook if it catered for their learners' abilities across cognitive levels. Additionally, for Nishen, a textbook had to be colorful and interactive in order to be attractive to learners.

[7] In simple terms, we define pedagogy as practices and decisions that the teacher makes in a classroom setting.

[8] The strong use of textbooks by CAPS (and NCS to a certain extent) and the straight forward specification of what needs to be taught was an attempt of these interventions to reverse the responsibility of a teacher as the main source of knowledge as it was the case with C2005.

Although this finding should be interpreted with caution, it can be argued that the CAPS curriculum structured the work of teachers in a way that forced them to rely on prescribed textbooks. It defined a teaching strategy for them.

Both Nishen and Zanele believed that there should be a close relationship between teaching and assessment. The curriculum encouraged blurring of the boundaries to take place around informal tasks more than formal ones (DOE, 2010). This could be explained by the self-assessment approach[9] both Nishen and Zanele used to evaluate their learners' assessment work. However, whilst Zanele explained the notion of using teaching and assessment interchangeably as a strategy that evaluated both the performance of learners and her teaching, Nishen viewed it as an instrument to identify candidates for the school's 'extended opportunity' offered to poor performers as a catch-up program. However, caution must be applied in the interpretation of Nishen's assertion of 'extended opportunity' since it was more a school procedure than her own, original belief.

Nishen also said that the change of curriculum from OBE to NCS and then to CAPS had affected her confidence in the classroom: She argued that teachers need to be given enough time to settle in the new intervention and to become confident in their classroom practices. Whilst she agreed that curriculum changes were inevitable, she also asserted that there is a tendency for teachers to stick to their teaching methods even if they (methods) are no longer consistent with the aspirations of the new curriculum.

Nishen and Zanele agreed that training alone would never be enough: Nishen relied on the support given to her by the school, and Zanele believed that the responsibility of understanding the curriculum depends on the individual teacher. This observation might be explained by the fact that Zanele had more experience than Nishen in the teaching of maths at the grade 8 level. Along similar lines, Ben-Peretz (1990) argued that teachers draw on personal knowledge and experience to assign meaning to the curriculum. In this regard, Zanele might have felt more saturated of teacher support than Nishen.

[9] Both Nishen and Zanele used a formative assessment approach and allowed learners to mark their own work in order to measure their (learners') performance.

Assessment connects to pedagogy and will thus be explored in depth in the following section.

Assessment

This section of the discussion examines teachers' understanding of their assessment practices and how it enabled the emergence of teachers' understanding of curriculum change in School 1.

Nishen believed that assessment both hindered her learners' capabilities and constrained her autonomy. She attributed this to two factors: over-reliance on the calculator by learners when performing assessment tasks, and the fact that she could not set the tasks for her learners' assessment. It was not clear from Nishen's belief as to how the over-reliance on calculators occurred or how exactly it constrained her learners' capabilities. Ruthven's research (1990) argued that the effectiveness of calculator usage depends on whether the emphasis is on mathematical strategy or arithmetic's, or on computation.

Nishen and Zanele both used formative assessment. They performed corrective teaching and allowed learners to mark their work. Morais and Miranda (1996) argued that one of the many ways in which the evaluation criteria can be made explicit to students is through assessment tests, and their correction and marking. However, this form of feedback to learners is viewed by others as problematic in that learners do not take errors they have discovered this way seriously (Nott, 2000). It could therefore be possible that whilst Nishen and Zanele viewed self-assessment as formative, learners might not have taken this the same way. This was evident in the learners' workbooks where there was a high number of missing corrections by learners, and teachers' comments that indicated that learners were not taking the work seriously.

Both Nishen's and Zanele's understanding of assessment forms concurred with the curriculum[10]. Both teachers knew the purpose of each assessment form (DOE, 2010, p.

[10] According to CAPS Document, 2010*; "Formal assessments provide teachers with a systematic way of evaluating how well learners are progressing in a grade and/or in a particular subject. Examples of formal assessments include tests, examinations,*

155). However, Zanele believed that a formal test assessed procedural knowledge whilst 'open-book'[11] (informal) tasks measured conceptual knowledge. Nishen on the other hand, showed that her preference was for the formal assessments, stating that it was easy to prepare learners, and formal assessments provided a true reflection of learner performance. Often, in any education system, all of the purposes and elements of both the formative and summative assessments are not mutually supportive, and can even be in conflict. What seems effective for one purpose may not serve, or even be compatible with, another. And so, teachers always find themselves having to balance the demand of the two assessments in their pedagogic practice (Bookhart & Nitko, 2011).

Goal Setting

Zanele claimed that the CAPS curriculum specified concepts and skills to be covered as goals for each lesson. Although these were stipulated in the beginning of each chapter of the prescribed textbook, goal setting was not necessarily the emphasis of the CAPS document and there seems to be no compelling evidence to argue that both Zanele and Nishen took goal setting into cognizance as a teaching strategy. This finding suggests firstly, that the notion of goal setting from the textbook perspective was merely a goal stipulation exercise (Bookhart & Nitko, 2011); and secondly, that it could have been an inconsistent use of the prescribed textbook[12] by the teachers (Remilliard, 2005).

Social Context and Curriculum Understanding

Nishen's and Zanele's views regarding the social backgrounds of learners were generally consistent with each other but also contradictory in some ways. Zanele felt it was easy to teach learners who came from privileged backgrounds, because they were cooperative, and their parents had a degree of involvement in the education of their

practical tasks, projects, oral presentations, demonstrations, performances, etc. Formal assessment tasks form part of a year-long formal Programme of Assessment in each grade and subject" (p. 53).

[11] Open-book test' referred to assignments, investigations and projects.

[12] It has been argued above that the prescribed textbooks omitted integration in its interpretation of the CAPS curriculum and the teachers seemed to have been consistent with the textbook and omitted integration in their classroom practices. However, the data in this section showed that the prescribed textbooks stipulated goals for each section of maths content and there was a lack of evidence to show that the teachers used this strategy in their teaching.

children. Zanele explained the roles of the teacher, learners and parents from both backgrounds. Whilst she praised the co-operation of learners in the privileged environment, her comments in their written work proved that they were not as co-operative as she thought they were.

On the other hand, Nishen believed that the availability of resources did not necessarily translate to performance: she viewed learners who came from poor backgrounds as equally responsible for their learning. Although this finding differed from some published studies (Bernstein, 1997; Hoadley, 2007) it was consistent with the strategy of 'extended opportunity' that School 1 provided for all under-performing learners, whether they came from a poor background or from privileged environments. Nishen herself came from a poor background[13] and the school had a significant number of learners who came from poor backgrounds, even though it is positioned in the privileging context. Some of the learners came from the surrounding townships.

School 2

A comparison of the two teachers in school 2 revealed that Ayola and Karuna had differing views of knowledge, pedagogy, assessment and social contexts. In the following section I will discuss their views with regards to these concepts.

Knowledge

Ayola found the curriculum (CAPS) frustrating because it was not sequenced in a way that made it easy for teachers to follow. She believed it was complicated for two reasons: it did not deal with mathematical concepts sequentially, and limited the opportunity for learners to understand the concept at hand. She believed her learners' ability was constrained by the curriculums' demands; jumping from one concept to another in a short space of time. She also believed that today's learners are mostly pre-

[13] For middle-class learners, the home is a second site of acquisition; middle-class family socialization is a hidden subsidy (Bernstein 1977, 133) that enables the students to acquire the school code more efficiently. Working-class students enter the school with a 'community code'; the school code is less developed in the family prior to encountering formal pedagogy.

occupied by things other than school learning. The second reason was that the external formal assessments set by the district official did not match her classroom practice. The district was sticking to the CAPS sequencing. She explained that the curriculum was to promote conceptual progression and instructional planning. The way the curriculum was structured[14] did not exhaust each concept before moving on to another: for example, the concept of Algebraic Expression and Equations appeared as the last two topics of Term 1 and opening topics of Term 2, the same topic did not appear in Term 3 whilst they are the second topics dealt with in the Fourth Term (CAPS, 2010, p. 74).

The reason for this sequencing was not explained, either in the curriculum document or in the prescribed textbooks. The curriculum seemed to have followed the 'spiral curriculum', which is characterized by the iterative revisiting of topics within the subject (Harden & Stamper, 1999). Ayola believed that such sequencing confused teachers and made her learners perform poorly, which teachers were blamed for. She sharply criticized this sequencing as it was a departure from NCS which left sequencing up to teachers, and many teachers followed the sequence in the curriculum documents as they were.

Ayola explained that her reliance on the use of NCS textbooks was caused by the fact that CAPS textbooks were confusing and all over the place (meaning she did not prefer the sequencing of these textbooks), and that they were not attractive to use. The possible explanation for this finding might be that although Ayola followed the CAPS sequencing, she might not have believed in its sequencing and had done little to move on from the NCS. Ayola used NCS textbooks for teaching and CAPS textbooks for assessment purposes.

Her learners' workbooks also showed that she was following the sequencing of CAPS. The learners' work was consistent (both in terms of time and content) with the other

[14] According to Bernstein in Hoadley and Jansen (2009), organizing knowledge entails how knowledge is structured and what status is given to particular knowledge versions of the curriculum. In his view, where there are strong boundaries between curriculum content there will be subject specialization. A curriculum that consists of subjects distinctly separated from each other has what Bernstein calls a closed content and is called 'collection' curriculum. This type of curriculum is organized in such a way that there are strong boundaries that are not easy to blur. This type of curriculum concerns itself about the state of knowledge rather than the ways of knowing. On the other hand, where there are no boundaries in the curriculum content, there will be no subject specialization. This orientation consists of subjects that are mingled with one another and Bernstein calls it an open content and the organizing principle of this curriculum is 'integration'. Contrary to the above, this is called weak classification. This type of curriculum is organized in such a way that there are weak boundaries which can be easily broken, like the broken lines in the article.

teachers (one from her school and two from the former model C school) (Ayola's Learners 1-5). Furthermore, this was also evidently coupled with the lack of explanation by Ayola as to how she thought mathematical knowledge should be structured. And so, they seemed to have preferred the NCS sequencing. There is a sharp difference between the teachers' approach to sequencing and Bernstein's (1996) view of mathematics as a horizontal knowledge structure[15] with a strong grammar (which encourages/discourages the acquisition or transmission of knowledge). Forced by the prescriptive nature of the CAPS curriculum, Ayola's and Karuna's approach seemed to have followed mathematics as vertical other than horizontal discourse in that they worked with it as a hierarchical, systematically principled structure. However, Bernstein's approach to the structure of knowledge is descriptive rather than prescriptive and thus does not necessarily imply that curriculum should be structured that way. Therefore it looked as though Ayola had a different understanding of sequencing to that of the curriculum. The curriculum is partly to blame because it was not explicit in its reasoning.

Karuna, on the other hand, believed that the structuring of the curriculum was not his responsibility as he viewed himself only as an implementer and not necessarily the developer or designer of curriculum. The *NCS Review Report* (2009) indicated that there was a strong resistance in the submission and hearings to the notion of teachers as curriculum designers, with such statements as 'curriculum development is not the core business of teachers'.

Karuna viewed South African interventions as having adopted other countries', only to implement them without proper modifications. For instance, he believed that the CAPS curriculum was adopted from the University of Cambridge, which he believed to be of a higher quality than NCS because the former produced learners that can compete globally. Although the study could not ascertain his claim about the adoption of curricula from other countries, his view about CAPS producing quality was consistent

[15] Horizontal discourse is typified as common-sense knowledge, oral, local, context-dependent and specific, tacit, multi-layered and contradictory across but not within concepts. Vertical discourse on the other hand "takes the form of a coherent, explicit, and systematically principled structure and hierarchically organized..." (Bernstein 1996, p. 159). Both the horizontal and vertical discourses have implications on the production, distribution and reproduction of official knowledge and how this knowledge relates to structurally determined power relations in the education setting.

with one of its aspirations, which is to provide 'an education that is comparable in quality, breadth and depth to those of other countries' (CAPS, 2010, p. 5), and suggested that there was a comparison with other countries curricula in the NCS review process.

Karuna's understanding of the CAPS curriculum related to the principle of progression within the subject of mathematics. He viewed the curriculum as starting from simple and moving to complex. The concept of progression was an important issue for moving from C2005 to NCS and then CAPS. The C2005 Review Report recommended a move towards vertical integration, which is the conceptual progression within the learning area or subject. This principle entailed that 'content and context of the subject must show progression from simple to complex' (p. 4). According to the Revised Bloom's Taxonomy[16] (Krathwohl, 2002), the process of learning needs to be hierarchical and must follow the process of remembering, understanding, applying, analysing, evaluating and creating, to become effective. The CAPS curriculum seems to have shown some evidence of this in that each time a concept is revisited, the level of complexity is increased. This could suggest that the curriculum's sequence followed Bloom's Taxonomy but the teachers did not follow the same sequence as they were following the textbooks.

It however appeared that there was contradictory evidence that arose from the chronological issuing of mathematical tasks to learners. For instance, one of the tasks that was given on 25 March 2014 was about substitution in an algebraic expression: $3(c-b) + (b+c)^2$ *where* $b=-2$ *and* $c= 5$. On 7 April 2014[17], the task was about simplifying an algebraic expression such as $y^2 + y^2$. This was the progression that was assumed by the prescribed textbook. And so, there may have been a discrepancy between the intentions of the curriculum, the prescribed textbook, and the teacher's understanding of the curriculum, which requires further research.

[16] Bloom's Taxonomy is a multi-tiered model of classifying thinking according to six cognitive levels of complexity (Forehand, 2005). Throughout the years, the levels have often been depicted as a stairway, leading many teachers to encourage their students to "climb to a higher (level of) thought." The lowest three levels are: knowledge, comprehension, and application. The highest three levels are: analysis, synthesis, and evaluation. "The taxonomy is hierarchical; [in that] each level is subsumed by the higher levels. In other words, a student functioning at the 'application' level has also mastered the material at the 'knowledge' and 'comprehension' levels."

[17] Karuna's learners' workbook, p. 18)

Pedagogy

This section is Karuna and Ayola's account of pedagogy in the context of curriculum change. Ayola believed that NCS encouraged group work, whilst CAPS encouraged learners to work individually. CAPS states that it encouraged both groupwork, and as learners working as individuals (CAPS, 2010, p. 5)[18]. Although the review report on NCS recommended that teachers be given guidance on methodologies that will specify what, how and when to use them, the CAPS curriculum was not explicit as to which methodologies to use, and how and when to use them. As a result, her view might either be a result of the textbook's omission of specific methodology for each concept or her personal preference in using the whole-class approach. The authors of the CAPS curriculum may have deliberately left methodologies unspecified to allow teachers to use their preferred pedagogies.

Ayola preferred repetition because she believed that it was appropriate for learners from less privileged backgrounds. Karuna believed that the curriculum encouraged learners to learn on their own without the assistance of the teacher. He believed that teacher's involvement should be limited in the learning of the child. He believed that a child had demonstrated learning when he/she had acquired mathematically required skills (referring to mathematical basic skills such as addition, subtraction, division, and multiplication). What the study noted was his reference to basic skills as limited to the lower levels of mathematical concepts, and not necessarily part of the everyday knowledge of the child.

The study can infer from this data that Karuna's understanding of the teacher's involvement in learning, and the child's awareness of the learning process, are inconsistent with the aspirations of the curriculum specifically and the literature in general (Craig, 2001; Vygotsky, 1978)[19]. His understanding left the process of learning

[18] The National Curriculum Statement Grades R-12 aimed to produce learners that are able to: Work effectively as individuals and with others as members of a team (CAPS, 2010, p. 5).

[19] According to Craig (2001), the level of learning is where one is conscious of learning or knowing – knowing to know. This is the awareness of one's capabilities – being able to recognize and acknowledge the familiar content and form and also the unfamiliar content and form. He argues that in order for one to realize and actually transcend from the familiar into the unfamiliar, s/he needs to 'act'. His/her action will enable him/her to discover the limits of the familiar and prompt the person to 'want to learn'. But if a

at a very superficial level, which could bring about a consciousness of the process in the mind of the child (Craig, 2001).

Although Ayola said that the new curriculum did not allow learners to take their work home, her learners' workbooks had a majority of classwork activities and a few homework activities. This instruction could have been her own understanding of the curriculum (Remilliard, 2005) or she might not have trusted that her learners would do their homework. Some of the issues about this finding relates specifically to one of the research questions around the effect of social background of learners in shaping teacher's understanding of curriculum change. I will turn to this later in the section on social background and curriculum understanding.

Ayola's view that there was a lack of support for her teaching, either internally within the school or externally from the department, reflects the need identified in the NCS Review Report, which recommended that 'Principals, HODs, District and Provincial support staff need….to be able to support teachers effectively' (NCS Final Report, 2009, p. 67). The reason for the apparent lack of support had to do with her belief that having to be trained on or learn the curriculum was inconvenient and time-consuming, and therefore not possible for her. Apart from the fact that she found training unhelpful (NCS Final Report, 2009, p. 56), another possible explanation could be that the school did not encourage teachers to attend training from the department. In this regard, it was apparent that Ayola would have wanted some kind of a structure that would be easily accessible to her. Although the department set tasks as support for teachers, Ayola viewed it as interference with her work, and wanted a different kind of support.

In summary, whereas Ayola was unwilling to waste time by receiving support, Karuna viewed himself and some of his colleagues from Zimbabwe as well positioned to easily understand the new curriculum. This implied that he did not feel he needed teacher support.

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person is not aware of what s/he does not know, s/he may not be 'motivated to learn'. And also if a person is continually exposed to the familiar, s/he may not see the need to actively engage in the pedagogic setting towards the unfamiliar.

Assessment

Assessment is also a significant part of Bernstein's (1996) triple message system which is the main framework for this study. The main premise behind looking at assessment in the studied schools was to explore teachers' implementation of assessment, and their understanding of the principles underlying the latest South African curriculum interventions.

Ayola said CAPS required more formal tests (she mentioned two) than NCS. This was inconsistent with the CAPS document which stated that one test could be conducted in a term (CAPS, 2010, p. 155). Ayola's reasoning could have emanated from the lack of explanation (to deviate from the curriculum assessment stipulation) by the school or the department about assessment requirements. This suggests that either the school or the department had not helped teachers interpret the policy as intended.

Karuna, on the other hand, knew the number and forms of assessment tasks required by CAPS for grade 8. He defined tests and projects as tasks that required recall and skills such as drawing and measurement, respectively. The drawing and measurement skills are additional to the basic skills that he referred to earlier in the discussion.

Karuna viewed assessment as an integral part of and a diagnostic tool for his teaching. Prior studies have noted the importance of meaningful assessment tasks for learning[20] (Vanderyar & Killien, 2003; Chapman, 2013).

Ayola felt the involvement of the district office in setting the tests for teachers interfered with her autonomy. It denied her an opportunity to set what she felt was appropriate for her learners, as she had taught them. This finding was in agreement with the *Review Report on NCS*'s (DOE, 2009) finding which showed that the formal assessments set by the districts were problematic in that these did not match progress in the school's

[20] This is influenced by several factors such as teacher's knowledge of content, knowledge of learners, goal for the task, beliefs about mathematics and instructional orientation (whether it is set to promote recognition or realization rules or both) (Chapman, 2013).

teaching program (p. 33). Sadler (1989) argued that the purpose of formative assessment is to identify the gap between the student's learning and the desired educational goals. The best-placed person to identify and address such a gap is the teacher in the classroom.

Ayola believed the greater weighting of the exam over other forms of assessment in the curriculum was inappropriate because it meant that formative assessment was not taken seriously. Whilst the *Review Report on NCS* (DOE, 2009) recommended a balance of 50% year mark and 50% exam mark for grades 4-9 (p. 37), the CAPS curriculum (DOE, 2011) stipulated 40% year mark and 60% exam mark. Ayola's assertion was consistent with the *Review Report on NCS* but not with the CAPS document. The inconsistency enabled the emergence of contradiction in Ayola's data in that on one hand she wanted more support in curriculum, but on the other she wanted independence in assessment. She wanted support rather than increased regulation.

Karuna's belief that assessment must have goals corresponds with the ideas of Bookhart and Nitko (2011), who suggested that when goals are clearly specified, they provide simple guidance for teaching and form the framework for the evaluation of learners. However, this study was unable to demonstrate Karuna's belief on goal setting by using only the learners' workbooks.

Social Context and Curriculum Understanding

This study took place in two schools with different contexts – a township and a former model C school in town. The data suggests that the way in which teachers viewed the social background of learners played a role in their understanding of how best to implement the curriculum.

Ayola believed the social background of her learners was a barrier to their learning. She felt the pacing of the curriculum did not take it into consideration. Hoadley (2008) describes two different 'modalities' of pedagogy emerging in different contexts – a vertical modality in a middle-class context, and a horizontal modality in a working-class

context. In her work, she argues that based on the non-availability of both material and cultural resources, the working class context is restrictive in its nature when compared to the middle class context. Her view was consistent with the concept of inclusivity[21] in the CAPS curriculum documents[22] and further supported by other research into effects of social class, teaching, and learning (Hoadley, 2008; Dunne & Gazeley, 2008; Bodovski, 2010; Naidoo, 2009).

Ayola adopted repetition as her preferred teaching style, which she believed was appropriate for learners. However, whilst this finding seemed consistent with the notion of managing inclusivity in a classroom, her adoption of repetition as a teaching style could be explained either by the fact that she believed her learners were not coping with the curriculum or she could have lowered her expectations of parental involvement in their learning (Bodovski, 2010). As argued by the literature, the curriculum might have lacked a balance between the elaborated and restricted codes that characterizes learners from working class contexts (Hoadley, 2008).

Conclusion

The research findings have indicated that teachers' understanding was impacted by many factors, including how they were prepared for the interventions, the social background of their schools or learners, their educational and teaching background and experience, and how they relate to the curriculum material, including textbooks. The discussion above has looked at how the afore-said factors enabled the emergence of teachers' understanding of curriculum change by reflecting on the issues these teachers raised around knowledge, pedagogy, and assessment as the main framework for this study.

[21] The *Guidelines for Inclusive Teaching and Learning, 2010* categorise, amongst others, the socio-economic barriers as created by learner's social backgrounds. It encourages teachers to be aware of these, identify them and plan around these barriers.

[22] "The key to managing inclusivity is ensuring that barriers are identified and addressed by all the relevant support structures within the school community, including teachers..." (DOE, 2010, p.5).

In this chapter, the study explored themes of knowledge, pedagogy, and assessment, and social contexts that related to curriculum change, and used these to frame the responses from all four participants. Within each theme the study discovered sub-themes that helped to understand teachers' perceptions of curriculum change.

The first theme the study dealt with was knowledge. There were two main sub-themes that strongly emerged from this part of data and those were integration of knowledge, and pacing and sequencing. Whilst teachers from the town school understood the concept of integration to be integrating everyday and school knowledge, as well as knowledge and skills, the township school was silent about it.

When it came to sequencing, the data indicated that of the four participants, three viewed curriculum as well structured and starting from simple to complex. They viewed sequencing as occurring within and across mathematical concepts, standardization of pacing and sequencing, and as a process of concept formation. Ayola on the other hand had a different view to her colleagues. She perceived the curriculum to be confusing as it jumped around from concept to concept, making it hard to follow. These opposing positions were explained in the discussion above as a result of the level of experience of the other three teachers, compared to Ayola.

The second theme related to pedagogy. In this regard, the data showed three interesting sub-themes worth discussing: teacher support, teachers' textbook use and teachers' preferred teaching styles. The town school had almost institutionalized teacher support through the HOD and the district. However, Nishen felt the support was interfering with her autonomy whilst Zanele thought the responsibility for understanding the curriculum lay with the individual teacher. Whilst Ayola thought it was the waste of time, Karuna thought he did not need it. The combination of factors listed above point to a need for training to be comprehensive, and contain details not just of the content of the policy and methodologies, but also the thinking behind the policy. And those doing the training should then be readily available for advice and reassurance in the implementation phase.

In terms of textbook use, teachers from the town school viewed textbooks more as a guide than a teaching tool, whilst School 2 teachers regarded them both as a guide and a teaching tool. Teachers in School 1 showed this by using the prescribed textbook interchangeably with other textbooks, whilst in School 1 evidence showed that the prescribed textbook was the only one used. It was argued that whilst these teachers showed opposing ways in how they engaged with curriculum material, they created an enacted curriculum with their learners and thus they were viewed by the study as active agents of the curriculum (Remilliard, 2005).

It has been argued that through its 'extended opportunity' the town school preferred individual attention for learners. The township school, on the other hand, showed a tendency towards the whole-class teaching. This could be argued based on the variability both in terms of numbers of learners and availability of resources in these schools. Furthermore, other teaching style, such as repetition, could be linked to the social context of the school.

The third theme that the study examined was assessment. Here the data showed two important sub-themes: formative assessment and the department's involvement in assessment.

The discussion above has shown that both schools implemented the same method of providing feedback to learners. However, the information received through this exercise by each school was used differently. Furthermore, the department's involvement in the assessment of learners was viewed by teachers from both schools as constraining.

The last theme that the study explored was concerned with whether the social context of the school played a role in teachers' understanding of curriculum change in any particular way. Interestingly, there was only one sub-theme that emerged and that was parental involvement in the teaching and learning relationship. There was a clear difference in perspective on both schools concerning parental involvement in the learning of their children. The town school viewed it as important and helpful in their

teaching, whilst the township school viewed it as unimportant because they lowered their expectation about the contribution of parents to their children's learning.

It can be seen that although different teachers emphasized different foci and expressed different views of curriculum change, the findings suffice to form an informed and solid opinion, which suggests that policy makers and the department would do well to consult those who are affected by curriculum change, especially teachers. It is also important for the department to pilot new interventions on a wide scale in order to prevent 'teething' problems in the actual implementation of the curriculum.

CHAPTER 5

Summary of Research Process

The focus of this study was about exploring teachers' understanding of curriculum change from National Curriculum Statement (NCS) to Curriculum and Assessment Policy Statement (CAPS) in the teaching of grade 8 Maths. It used semi-structured interviews from two grade 8 maths teachers each from two schools of varied social contexts in the eastern part of Gauteng. These provided the primary data for the analysis in the study. The interviews explored teachers' discourse, views, beliefs, conceptions about curriculum change, and the contexts that informed the findings. The data from the learners' workbooks that was intended to provide opportunities for triangulating teachers' responses was limited, because the prescriptive approach of the curriculum meant that little variation was evident in learners' work.

Although the study was not about textual document analysis, curriculum documents were examined to better understand participants' responses, and to locate their students' work. The study then used Bernstein's (1996) triple message system - knowledge, pedagogy and assessment - in order to provide the framework for analysis in the study.

Summary of Findings

This study described and discussed the findings of teachers' understanding of the two schools, a township and a town school, in order to answer the main research question about teachers' understanding of curriculum change from NCS to CAPS in the teaching of grade 8 mathematics.

The findings indicated that teachers' understanding was impacted by many factors, including how they were prepared for the interventions, the social background of their schools or learners, their educational and teaching background and experience, and how they related to the curriculum material, including textbooks. The discussion that follows will expand the understanding of curriculum change by reflecting on understandings and

practices relating to knowledge, pedagogy and assessment as the main framework of this study.

Knowledge

The discussion that follows is informed mainly by issues that emerged from the study regarding knowledge, which were: integration of both everyday and school knowledge, and mathematics with other subjects; sequencing as in conceptual sequencing within a mathematical concept and across mathematical concepts.

Integration

Teachers from the town school referred to integration in two ways: the integration of everyday and school knowledge and the integration of knowledge and skills. However, these distinctions were not evident in their practice. This omission could be explained by the curriculum material (including textbooks) which prescribed the manner in which teachers should work in an integrated way, but did not explicitly define how it should take place in practice. The curriculum had explicit boundaries between mathematics with other subjects, and everyday and school knowledge.

On the other hand, the township school was silent on the issue of integration. The lack of integration in this school suggested a compromise in the importance of its learners' everyday knowledge which is, according to research (Muller & Taylor, 2000), one of the important elements of learning. In this regard, Muller & Taylor (2003) argues that there should be a selective use of everyday knowledge in order to exemplify and apply relevant principles of formal knowledge, and a careful structuring of the relationship between the formal and the everyday. On the other hand it might mean that eighteen years into curriculum interventions in South Africa, the education system has overcome the unhelpful emphasis of everyday knowledge as an important element of learning.

Sequencing

Generally three of the four teachers viewed the CAPS curriculum as well structured in starting from simple and increasing in complexity. This conceptual progression was particularly viewed by Karuna as occurring within and across mathematical concepts. Whilst Zanele viewed it as resulting from the standardization of pacing and sequencing, Nishen looked at it as a process of concept formation. Ayola, from the township school, had a different view to her colleagues: she found the curriculum confusing as it jumped between concepts, making it hard to follow. She would have preferred the curriculum to exhaust each mathematical concept before moving on to the next one. The curriculum did not explain the logic of the sequencing used, to teachers. Three of the four teachers had experienced both the NCS and CAPS in their teaching career in South Africa while Ayola had only experienced CAPS, as a teacher. It may be that because NCS left sequencing up to teachers that the other three teachers had a greater appreciation for the sequencing provided by CAPS.

Pedagogy

As mentioned above, there were three issues that emerged in this section of the study: Teacher support, textbook use and preferred teaching styles.

Teacher Support

Both teachers in the town school mentioned the notion of teacher support: Nishen viewed the setting of tests by external agencies like the HOD and the district as interfering with her autonomy, and Zanele said it was important but she thought the responsibility for understanding the curriculum lies with the individual teacher. In the township school, there was no mention of external help by either Ayola or Karuna, partly because the curriculum could not specify the methodologies of teaching but also because the school did not institutionoalise support to teachers as the town school did. Support from the department was viewed by them as poorly structured and of limited benefit to teachers. Ayola viewed it as a waste of time.

Teacher support was institutionalized in the town school whereas teachers in the township school relied on their own efforts to understand the curriculum. As this was the responsibility of the HOD within the school, there were two mathematics HODs in the town school, and only one in the township school. It was further interesting to note that both Zanele and Karuna (from different schools) agreed on issues of teacher support: Zanele viewed it as her responsibility and Karuna saw himself as well positioned to understand the curriculum because of his origin, teaching experience, and educational background in curriculum studies.

Teachers' Textbook Use

Nishen, Zanele and Ayola viewed textbooks more as a teaching guide than a teaching tool. A teaching guide because they could use them to see what needed to be taught, for how long, and for assessment exercises required by the department; and a teaching tool because they used them to teach learners. They made choices as they navigated between the prescribed and other textbooks (particularly the NCS textbooks) to select a teaching strategy. They used the prescribed textbooks as a guide for what needed to be taught, and other textbooks as a source that informed their teaching (explaining concepts to learners), and returned to the prescribed one for assessment. However, the prescriptive nature of the curriculum prevented them from interacting with it at an interpretative level (Remilliard, 2005).

Karuna regarded the prescribed textbook both as a guide and a prescriptive tool for his teaching. He used the textbook to determine what needed to be taught, and how to teach it. At face value, it is easy to argue that he had a passive engagement with the prescribed textbooks.

However, the preferred teaching styles by the township school teachers and navigation through the prescribed and other textbooks by town school teachers, indicated that teachers are not mere conduits, or implementers of the curriculum, but active agents who construct the enacted curriculum through their work with their students (Clandinin &

Connelly, 1992). This questions the popular assumption that teachers are lazy and do not know what they are doing.

Preferred Teaching Styles

Neither Nishen or Zanele demonstrated a preference for any particular teaching style. However the 'extended opportunity' instituted by the town school indicated that the school encouraged a focus on individual learners' progress.

On the other hand, both Ayola and Karuna, at the township school, believed that the curriculum preferred learners to work individually. The study also found that in the absence of guidance from the curriculum, these teachers resorted to whole-class teaching as a strategy. However, a slight difference existed in that Ayola believed in the heavy involvement of the teacher (through repetition) whereas Karuna thought that teacher involvement should be limited. This was inconsistent with the literature, which argues that a less enabling context tends to align with communally teaching strategies such as groupwork, whereas the enabling one tends to encourage individualistic approaches to teaching such as whole-class teaching (Bernstein, 1977; Hoadley, 2008; Naidoo, 2009; Dunne & Gazeley, 2008; Morais & Miranda, 1996).

Assessment

Formative Assessment

Teachers from both schools used formative assessment: they used self-assessment to allow learners to mark their own work, but the evidence confirms what is stated by the literature (Nott, 2000): this form of feedback is problematic because is not taken seriously by learners.

However, in the town school, under-performing learners were placed into the 'extended opportunity' program in order to support them. Determining the success of the programme was beyond the scope of this study.

Department's Involvement on Assessment

There is also strong evidence that highly prescriptive assessment practices (what needs to be assessed, who conducts it, and how) by the department were experienced as constraints by all the teachers. Interestingly, the least experienced participant found it the most constraining. The concern was about the level of involvement by the district in the assessment of learners. The teachers' concerns suggested that the issues raised in the *Review Report* (DOE, 2009) especially about how assessment is to be conducted, continue to be problematic.

Social Contexts and Teachers' Understanding of Curriculum

The important issue that emerged about the social context of the schools was the parental involvement in the learning of their children. Therefore, the following discussion will look at the explanation of the views of teachers about the parents' involvement and how this shaped their views about curriculum change and their pedagogic practice.

Parental Involvement

Both Nishen and Zanele in School 1 saw the involvement of parents in the learning of their children as important and helpful in their teaching: families were seen as co-partners in the teaching of their children. Families served as a source of information and provided resources that played a crucial role in their teaching. Although the school was located in an enabling context, not every child in the school came from well resourced families, some were from surrounding townships. Despite this, Nishen believed that the

availability of resources did not necessarily translate to performance in a learner. She saw learners of poor backgrounds as equally responsible for their learning.

On the other hand, the deliberate exclusion of everyday knowledge in their teaching and the decision to prevent learners from taking their work home was evidence that Ayola and Karuna viewed parental involvement as unimportant. Ayola felt the curriculum did not take her learners' backgrounds into consideration and she believed it was a barrier to their learning. She used repetition because she believed it was appropriate for the learners in her context and because of their poor language abilities: this created tensions with the pacing of the curriculum. Ayola mostly responded in the vernacular during the interview with the researcher and this bears witness to this claim.

Conclusion

It should not be surprising that teachers responded to the same curriculum policies in such varying ways as the curriculum is enacted differently in different settings. The teachers in the interviews conducted in the study had a broad range of years of experience in the profession; in some cases extensive experience in mathematics teaching; and they taught learners from different social backgrounds and with a variety of mathematical aptitude. This demonstrated the many difficulties associated with rolling out one curriculum policy to all South African schools. This is brought into even sharper contrast when one looks at the prescription of work sequencing and pacing of the curriculum for all learners. Starting from such unequal positions, it should be no surprise that teachers hold a wide variety of views about curriculum reforms in South Africa.

Answer to Research Questions

Interview data showed a complex position with regard to how teachers perceive and respond to changes in reality. It is important to note that the integration of data received

from both the primary and secondary data sources indicated that curriculum in South Africa is progressing towards more prescriptive approaches.

Looking at teachers' understanding of curriculum change from NCS to CAPS in the teaching of grade 8 maths, the study's findings for my first research question; How do teachers understand the fundamental principles underlying the latest South African interventions?, were multi-fold:

At first glance, teachers generally understood the curriculum to be informed by several principles, such as integration and sequencing (on knowledge), and formative assessment and departmental involvement versus teacher's autonomy (on assessment). Whilst the understanding of these principles differed from teacher to teacher, it provides evidence that teachers work with what they see the curriculum entails and not necessarily what it really intends. What teachers understand about the curriculum may not necessarily be what they practice. The reason for this may be the fact that the curriculum is not explicit in specifying the approach to teachers and the tendency of teachers to cling to the past curriculum as a benchmark for the CAPS.

On the study's second question: In what way social class of learners affects teachers' understanding of curriculum change from NCS to CAPS; the research partly confirmed the assumption that curriculum change perpetuates inequalities across contexts whilst it purports to eradicate them. The findings indicated that teachers in the less privileged contexts believe the social background poses difficulty in the learning process. Although this is confirmed by literature (Bernstein, 1977; Hoadley, 2008; Naidoo, 2009; Dunne & Gazeley, 2008; Morais & Miranda, 1996), especially in the manner in which everyday knowledge was almost completely omitted by the teaching of township school, the nature of the schools in the study - with many learners in the town school coming from surrounding townships made it difficult to make categorical findings about the role played by social context in the two settings. Similarly, teachers from the township school believed that parental involvement was a barrier to the learning of the children and was unhelpful in the process of teaching and learning, while teachers from the town school saw parental involvement as important and helpful to their classroom practice.

These differing views suggest ways in which the social contexts that teachers find themselves in affect teachers' understandings of enacted curriculum.

The third research question: In what way do grade 8 teachers believe that curriculum change from NCS to CAPS affects their pedagogic practice in the teaching of maths? was difficult to answer directly. The teachers' interaction with the curriculum and curriculum change was mediated by their use of textbooks, both as a tool to understand the curriculum and as a strategy for their teaching. These findings suggest that if the intended curriculum is silent around methodology, teachers tend to use pedagogies that are suggested in textbooks or in the case of a prescriptive curriculum, teachers may navigate between the old and the new curricula through their use of textbooks (Weinbrenner, 1992; Olson, 1989; Remilliard, 2005).

Limitations

The need to spell out the limitations of social research arises from the power of the research to convince (Shipman, 2014). The following discussion focuses on the limitations of the study by looking at various factors.

Relying upon interview information for qualitative research is often criticized because interviews are not easily cross-checked and a lot of the information occurs in one-off, non-repeatable, isolated incidents. It can therefore be 'selective, biased, personal, and subjective' (Cohen et al., 2007:256). It is likely that evidence collected in interviews as well as the conclusions drawn from them to be specific to the context and cannot be generalized to the rest of the country. This likelihood is unfortunately increased by choosing schools so close to one another (15 km apart), and all served by one particular district office, the North East District office of Gauteng. My research sample consisted of three female teachers and only one male teacher (who in turn were not of the South African origin). While this was unintentional, the researcher feels that to balance the gender and limit the influence of another country in the data might broaden the perspectives that were offered, and thus enrich the data obtained.

For more conclusive results, the study recommends that research to be done at a later stage of the implementation of the CAPS curriculum. The CAPS curriculum was only implemented in 2012 and the study, conducted in 2014, occurred at a time when the teachers were still coming to grips with the technicalities of the curriculum.

The framework of the study using Bernstein's triple message system of knowledge, pedagogy and assessment, limited the study to a superficial understanding of teachers' perceptions of curriculum change. This is because each aspect is complex. Therefore, this study recommends an individual focus of these concepts to enhance research of teachers' understanding of curriculum change.

Implications and Recommendations

This study investigated how teachers understood the fundamental principles underlying the latest curriculum interventions in the South African context and how their understanding affected their pedagogic practice in the teaching of maths. However, as with all research, it raised more questions, listed below, and these may inform further research:

(1) The CAPS curriculum is more prescriptive than the NCS: it has increased levels of specification on content pace and sequencing. Policy makers could take the effects of the enacted curriculum on the intended curriculum into account when they mediate the gap that always exists between the two. This mediation must be flexible in order to accommodate various teacher contexts, rather than a one-size-fits-all kind of mediation. Furthermore, it is also the view of this study that this mediation should include enrolling teachers affected by the intervention into curriculum studies.

(2) The study found that in their practice, teachers define their own preferred approaches to interacting with curriculum material and that these approaches differ from teacher to teacher: in this regard, it is recommended that policy makers pay close attention to how other critical curriculum documents, such as textbooks, help teachers interpret the intentions of the curriculum. Furthermore, it is recommended that the research community expands the research into the

role the textbooks and other curriculum tools that help teachers interpret the curriculum policy.

(3) Although teachers will always make their own choices within their pedagogic settings, if the curriculum was more explicit about issues of methodology, teachers may be able to locate their practices better.

Reflections

Although Karuna (of Zimbabwean origin) was a valuable source of data, his inclusion in the sample did not fit the idealized paradigm of the researcher. The value of having diverse staff needs to be more thoroughly researched. Similarly, the fact that the participants were chosen by the principals, who were likely to have selected their stronger teachers, may have distorted the findings somewhat.

The study was conducted by a novice researcher. However, the case study approach adopted in the study may have limited any negative impact on the study. What was most difficult was dealing with a huge amount of data and not being able to explore it in depth. Although the pilot only took place with two teachers from other schools of varied contexts (almost similar to those in the actual study), broader piloting could have enabled the researcher to further strengthen the research instruments.

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APPENDIX 1: Interview Guide

Semi-Structured Interviews

Introduction

Thank you very much for availing yourself to this interview. I want you to know I appreciate your time.

Confidentiality

You should understand that anything that you exchange in this interview is confidential and this information will only be used for the purposes of this research. To protect your confidentiality, no personal identifying information about you will be recorded in the research findings. Research records will only be used for the purposes of this study and for the writing up of my MEd research report.

You are participating in this research on a voluntary basis – remember that you can refuse to answer a particular question at any time or withdraw from the research process at any time.

If you have any questions about this study or your rights as a research participant, you may contact me at:

Thokozani Mlambo at 078 876 1380 anytime.

Ms Bronwen Wilson-Thomson-, School of Education, University of Witwatersrand at 011 717 3198.

Questions

1. Having implemented the new curriculum – CAPS, how would you say it helps you in your work?
    - What in your opinion appears to be the emphasis of this curriculum in general?
    - What in your opinion appears to be the emphasis of this curriculum in your teaching of grade 8 maths?
2. How well would you say you are prepared to use CAPS for Mathematics?
3. In what way would you say content knowledge has changed between NCS and CAPS?
4. What is important to you regarding the assessment of learners in CAPS?
    - What views do you have on the purpose of assessment in Mathematics: the types of assessment tasks; when do you use them and why?

- How do you choose assessment tasks and how do those link to your teaching?
- Do you think the views you have on assessment match with your nature of choosing and marking assessment tasks?

5. In your opinion, how does this change affect you in your classroom decisions and practice?
6. What kind of textbook(s) do you use now? Would you use the same textbook as the one you used before? Why? Or Why not?
7. Do you think your learners understand your approach of teaching currently?
    - If yes, how so?
    - If no, what do you think is the reason?
8. Is there anything else that we have not discussed that you would like to share with me?
9. Having implemented both NCS and CAPS at this level, which curriculum do you think is best suited for your learners and why?

APPENDIX 2: Teacher's Consent Form

WITS UNIVERSITY SCHOOL OF EDUCATION
27 ST ANDREWS ROAD
PARKTOWN
JOHANNESBURG
2000.

Thokozani Mlambo
MEd Candidate

Dear _____

CONSENT TO PARTICIPATE IN A STUDY: Exploring teachers' understanding of curriculum change from National Curriculum Statement (NCS) to Curriculum and Assessment Policy Statement (CAPS) in the teaching of Grade 8 Maths.

DESCRIPTION: You are invited to participate in a research study of exploring teachers' understanding of curriculum change from National Curriculum Statement (NCS) to Curriculum and Assessment Policy Statement (CAPS) in the teaching of Grade 8 Maths. This study forms part of my M.Ed research at Wits University.

For this study I will:

1. interview you once in the time we both shall agree upon. I will also take written notes and make audio recording during the interview.
2. ask some of your learners' workbooks to analyse one assessment exercise about the '*Algebraic Equations'*.

   The following criteria should be used in choosing the learners' workbooks:

   Algebraic Equations

   1 boy and 1 girl – lowest performers

   1 boy and 1 girl – middle performers

   1 boy and 1 girl – high performers

The interview is aimed at getting your understanding of curriculum change with regards to knowledge, pedagogy (teaching approach) and assessment in the curriculum – CAPS. The task analysis, by using your learners' workbooks, is aimed at your learners understanding of your assessment – at how you make the tasks choices in your teaching. Unless you request otherwise, your and learners' names will be kept completely confidential at all times and in all academic writing about the study.

RISKS AND PAYMENT: There are no foreseeable risks in participating in this study. You will not be paid for participating in the study. If you have any concerns about participation, or any questions that you would like to ask, please contact me at any time.

TIME INVOLVEMENT: I will conduct the interviews at a time that is mostly convenient to you. This can be during break, your free period or after school, lasting about an hour.

PARTICIPANT'S RIGHTS: If you have read this form and have decided to participate in this project, please understand that your participation is voluntary and you have the right to withdraw your consent or discontinue participation at any time without consequences. You have the right to refuse to answer particular questions. Your individual privacy will be maintained in all published and written data resulting from the study.

RECORDINGS: Once the recordings are no longer needed for research or teaching purposes, they will be destroyed. This will be three years after the completion of the study.

CONSENT

Please complete by making a tick on an appropriate line hereunder, sign and return the form.

CONSENT FORM

I consent to participating in the study:

_____ Yes

_____ No

I consent to be interviewed at a time convenient to me:

_____ Yes

_____ No

I consent to being audio recorded during the interview:

_____Yes

_____No

I consent to choose and issue my learners' workbooks and provide these for the researcher provided the parents consent is in place:

_____Yes

_____No

The extra copy of this consent form is for you to keep.

FOR QUESTIONS ABOUT THE STUDY, CONTACT:

Thokozani Mlambo Phone: 078 876 1380

P.O. Box 24819 Fax: 086 544 3094

Newcastle Email:

thokozani_mlambo@yahoo.com

2940.

Signature: _____ Date: _____

APPENDIX 3: Parent's Consent Form

WITS UNIVERSITY SCHOOL OF EDUCATION
ST ANDREWS ROAD
PARKTOWN
JOHANNESBURG
2000.

Thokozani Mlambo
MEd Candidate

Dear Parent/Learner

CONSENT TO PARTICIPATE IN A STUDY ON GRADE 8 MATHEMATICS CLASSROOM PRACTICES

FOR QUESTIONS ABOUT THE STUDY, CONTACT:

DESCRIPTION: Your child is invited to participate in a research study on exploring teachers' understanding of curriculum change from National Curriculum Statement (NCS) to Curriculum and Assessment Policy Statement (CAPS) in the teaching of Grade 8 Maths. This study forms part of my Master of Education research at Wits University. Your grade 8 child's mathematics teacher is participating in this study. I will interview your child's teacher about how his/her understanding of the new curriculum. I will be reviewing your child's Mathematics workbook to look at only one exercise the teacher has given them for term 3. The workbook of your child will have been chosen by his/her teacher for me.

Your child's name will be kept completely confidential at all times and in all academic writing about the study. If you give permission, information gathered in this regard may be shown at conferences or in teacher education programmes.

RISKS AND BENEFITS/PAYMENT: There are no foreseeable risks in participating in this study. You will not be paid for your child's participation in the study. Benefits of

the project will be a contribution to understandings of the new curriculum in the teaching of mathematics.

If you have any concerns about your child's participation, or any questions that you would like to ask, please contact me at any time.

SUBJECT'S RIGHTS: If you have read this form and have decided that your child participates in this project, please understand that his/her participation is voluntary and you have the right to withdraw your consent or discontinue your child's participation at any time without penalty. Your child's individual privacy will be maintained in all published and written data resulting from the study.

CONSENT

Please complete, sign and return the form attached. Please note that if you do not return the form a week before classroom observations commence, it will be assumed that you have consented to your child's participation in the study and s/he will be videotaped.

CONSENT FORM

I consent to my child participating in the study:

_____ Yes

_____ No

I consent to my child's workbook chosen for the study:

_____ Yes

_____ No

The extra copy of this consent form is for you to keep.

Thokozani Mlambo

P.O. Box 24819

Newcastle

2940.

Phone: 078 876 1380
Fax: 086 544 3094
Email: tjm145555@gmail.com

Learner: _____ Date:_____

Please print your name: _____

Parent's signature: _____

Name: _____ Date: _____

APPENDIX 4: Zanele's Comments on Learners' Work

Learner	***Comments Made***	**Page Number**	**Remarks**
Zanele's Learner 1	*"you do not pay attention in class and you are lazy*	Pg. 4	
	"You don't show evidence of listening in class at all"	Pg.5	Exercise 6.6 √9 = 9x9 – Learner's response Teacher added with a red pen and the sum looked like: $\sqrt{9^2} = \sqrt{9x9} = 9$
	"No work done"	Pg.10	
Zanele's Learner 2	*"Incomplete"*	Pg.22	Big two question marks over the writing of the learner
	"You have examples above. Use them to guide you on doing this exercise!!"	Pg.27	
			Some learners' work bears no evidence of the teacher having looked at it (14 -22 May 2014, Zanele's Learner 1 – 6)

APPENDIX 5

Wits School of Education

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2011ECE104C
06 July 2011

Mr. Thokozani Mlambo
P O Box 24819
NEWCASTLE
2940

Dear Mr. Mlambo

Application for Ethics Clearance: Master of Education

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

Exploring teachers understanding of curriculum change from National Curriculum Statement (NCS) to Curriculum Assessment Policy Statement (CAPS) in the teaching of Grade 8 Maths

The committee recently met and I am pleased to inform you that clearance was granted. The committee was delighted about the ways in which you have taken care of and given consideration to the ethical dimensions of your research project. Congratulations to you and your supervisor!

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

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

All the best with your research project.

Yours sincerely,

Yours sincerely

MMabeta

Matsie Mabeta
Wits School of Education

Cc Supervisor: Ms. B. Wilson-Thompson (via email)

Appendix 6: Task Analysis Template

TASKS DOMAIN	COGNITIVE LEVELS			
	Lower Level of Cognitive Demand		Higher Level of Cognitive Demand	
	Memorization	Procedures, no connection to meaning	Procedures, connection to meaning	Exploring and understanding the nature of Maths concepts, processes or relationships
Task in textbook or Curriculum Document				
Task as set by the Teacher				
Task as responded to by Learners				

GAUTENG PROVINCE
Department: Education
REPUBLIC OF SOUTH AFRICA

For administrative use:
Reference no: D2015 / 170

GDE RESEARCH APPROVAL LETTER

Date:	23 June 2014
Validity of Research Approval:	23 June 2014 to 3 October 2014
Name of Researcher:	Mlambo T.J.
Address of Researcher:	218 Aloe Place
	Greenstone Hill
	Edenvale
	1610
Telephone Number:	011 977 6458; 078 876 1380; 082 77 59446
Fax Number:	011 977 6627
Email address:	thokozani_mlambo@yahoo.com
Research Topic:	Exploring teachers' understanding of curriculum change from National Curriculum Statement (NCS) to Curriculum and Assessment policy Statement (CAPS) in teaching Grade 8 Mathematics in a township and former Model C school in Gauteng
Number and type of schools:	TWO Secondary Schools
District/s/HO	Ekurhuleni North

Re: Approval in Respect of Request to Conduct Research

This letter serves to indicate that approval is hereby granted to the above-mentioned researcher to proceed with research in respect of the study indicated above. The onus rests with the researcher to negotiate appropriate and relevant time schedules with the school/s and/or offices involved to conduct the research. A separate copy of this letter must be presented to both the School (both Principal and SGB) and the District/Head Office Senior Manager confirming that permission has been granted for the research to be conducted.

Makhado
2014/06/24

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Making education a societal priority

Office of the Director: Knowledge Management and Research
9th Floor, 111 Commissioner Street, Johannesburg, 2001
P.O. Box 7710, Johannesburg, 2000 Tel: (011) 355 0506
Email: David.Makhado@gauteng.gov.za
Website: www.education.gpg.gov.za

The following conditions apply to GDE research. The researcher may proceed with the above study subject to the conditions listed below being met. Approval may be withdrawn should any of the conditions listed below be flouted:

1. *The District/Head Office Senior Manager/s concerned must be presented with a copy of this letter that would indicate that the said researcher/s has/have been granted permission from the Gauteng Department of Education to conduct the research study.*
2. *The District/Head Office Senior Manager/s must be approached separately, and in writing, for permission to involve District/Head Office Officials in the project.*
3. *A copy of this letter must be forwarded to the school principal and the chairperson of the School Governing Body (SGB) that would indicate that the researcher/s have been granted permission from the Gauteng Department of Education to conduct the research study.*
4. *A letter / document that outlines the purpose of the research and the anticipated outcomes of such research must be made available to the principals, SGBs and District/Head Office Senior Managers of the schools and districts/offices concerned, respectively.*
5. *The Researcher will make every effort obtain the goodwill and co-operation of all the GDE officials, principals, and chairpersons of the SGBs, teachers and learners involved. Persons who offer their co-operation will not receive additional remuneration from the Department while those that opt not to participate will not be penalised in any way.*
6. *Research may only be conducted after school hours so that the normal school programme is not interrupted. The Principal (if at a school) and/or Director (if at a district/head office) must be consulted about an appropriate time when the researcher/s may carry out their research at the sites that they manage.*
7. *Research may only commence from the second week of February and must be concluded before the beginning of the last quarter of the academic year. If incomplete, an amended Research Approval letter may be requested to conduct research in the following year.*
8. *Items 6 and 7 will not apply to any research effort being undertaken on behalf of the GDE. Such research will have been commissioned and be paid for by the Gauteng Department of Education.*
9. *It is the researcher's responsibility to obtain written parental consent of all learners that are expected to participate in the study.*
10. *The researcher is responsible for supplying and utilising his/her own research resources, such as stationery, photocopies, transport, faxes and telephones and should not depend on the goodwill of the institutions and/or the offices visited for supplying such resources.*
11. *The names of the GDE officials, schools, principals, parents, teachers and learners that participate in the study may not appear in the research report without the written consent of each of these individuals and/or organisations.*
12. *On completion of the study the researcher/s must supply the Director: Knowledge Management & Research with one Hard Cover bound and an electronic copy of the research.*
13. *The researcher may be expected to provide short presentations on the purpose, findings and recommendations of his/her research to both GDE officials and the schools concerned.*
14. *Should the researcher have been involved with research at a school and/or a district/head office level, the Director concerned must also be supplied with a brief summary of the purpose, findings and recommendations of the research study.*

The Gauteng Department of Education wishes you well in this important undertaking and looks forward to examining the findings of your research study.

Kind regards

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Dr David Makhado
Director: Education Research and Knowledge Management

DATE: 2014/06/24

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