UNIVERSITY OF KWAZULU-NATAL

A CASE STUDY OF LEARNERS' GENDER CONSTRUCTIONS IN A PHYSICAL SCIENCES CLASSROOM

by

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ABSTRACT

Contemporary gender studies focus on the contexts in which particular discourses shape the construction of masculinities and femininities. With a need to understand what it means for boys and girls in particular South African classrooms to study Physical Sciences, this small-scale case study explored girls' and boys' constructions of gender through examining the researchable relations of power. Drawing on poststructuralist theories, which define power as multidimensional, and shifting, I explored how boys and girls are produced as a nexus of subjectivities.

This study is located in a grade 10 Physical Sciences classroom in a school from the Umlazi Township, in Durban. Located within a poststructural feminist paradigm, I used a qualitative research methodology with case study as the method, with observations and interviews to collect the data. The analysis of the data on power relations between the learners, and between the learners and the science taught provided an insight into the performances of boys and girls and the constructions of gendering. In this study, the main constructions of gender were that of the hegemonic '*Machismo Masculinity*' and '*Compliant/Resistant Femininity*'. The discourses of power that shaped the constructions of masculinity and femininity were the learners' use of classroom space, learner interactions and their interactions with the decontextualised 'masculinist' science. Here, relations of power were context dependent and constantly shifting. Without seeking generalisation, this case study concludes that contexts are critical in shaping the performances of masculinities and femininities, which in turn define the constructions of gender.

This study highlights the complexity of gender studies and the need to give due consideration to how gendered selves are constituted in discursive chains especially where it intersects with discourses such as curriculum and pedagogy. Importantly, in broader terms, there is a need to deepen scientific enquiry to include the social aspects of learning, which will assist in understanding the way science is taught and learnt. Hence, gender studies should move beyond quantifying participation and performance, towards trying to understand how subjectivities create both possibilities and constraints for learners.

PREFACE

DECLARATION

I, ... declare that:

   i.   The research reported in this dissertation is my own work.

  ii.   This dissertation has not been submitted for any degree or examination at any other university.

 iii.   This dissertation does not contain other persons' data or writing, unless specifically acknowledged as being sourced from other researchers. Where other written sources have been quoted, then

        (a) their words have been re-written and the general information attributed to them has been referenced;

        (b) where their exact words have been used, their writing has been placed inside quotation marks, and referenced.

 iv.   This dissertation does not contain information copied from the Internet, unless specifically acknowledged and referenced.

  v.   The data in this dissertation has been gathered with due regard to the research ethics guidelines supplied by the Faculty of Education.

....

              Signature   Date

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I would like to express my appreciation to the following persons:

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- A dear friend for his inspiration and gentle encouragement

DEDICATION

This dissertation is dedicated to all the young boys and girls who are triumphant despite their struggles; and especially to my daughters Selisha and Serena, for whom I wish a life full of triumphs.

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CHAPTER 1

BACKGROUND AND INTRODUCTION TO THE STUDY

1.1   INTRODUCTION AND BACKGROUND

Schooling, as a powerful socialising agent, is an important arena for the construction of gender (Bhana, 2002, p.154). This is linked to, among other things, the power discourses within classroom contexts. Classroom culture is one of the key mechanisms through which masculinities and femininities are mediated and lived out (Bhana, 2002). In classrooms, the power/knowledge of the curriculum also contributes to the construction of masculinities and femininities (Paechter, 1998, p.27).

In post-apartheid South Africa, gender equality is enshrined in the Constitution and is supported by a number of initiatives, especially within the education sector. In education, curricular transformation has begun in earnest. Despite several strides, the Gender Equity Task Team (GETT) Report (Wolpe et al., 1997, p.23) identified a number of hurdles to the transformation of the South African education system. For girls in mathematics and science, Wolpe et al. (1997, p.104) state that generally, significantly fewer girls pursue and pass these subjects at secondary schools and that the reasons for this may be complex and multi-faceted. The Report indicates that most of the initiatives on gender equity have focused on providing access to girls and women to key positions of power (Wolpe et al., 1997, p.43). A common notion is that a numerical victory, which is politically loaded, can account for gender equity without giving due consideration to the lived experiences of both girls and boys at the formative level of schooling where their experiences shape their construction of gendering. It becomes

important then to understand whether and how discourses at the various learning sites legitimise discursive gendering practices. One such site, a grade 10 Physical Sciences classroom, with implications of the curriculum as a power/knowledge variable, was examined in this study to explicate this gendering.

1.2 PURPOSE

The purpose of this study was to examine the power discourse(s), in a grade 10 Physical Sciences classroom in order to understand how girls and boys construct their gendering. In the context of a society rife with violence against women, gender discrimination and misogyny, an understanding of the construction of gender is important in beginning to understand how learning sites may legitimise discursive gendering practices. Without refuting the many other factors that contribute to the construction of gendering, a study of a specific classroom context can present it as a complex site, offering spaces for both resistance and agency.

1.3 RATIONALE

My own experiences of Physical Sciences classrooms are that there may be gendered power differentials in terms of learners' engagement with the subject matter and their interactions with each other seem to revolve around the status of the subject. Certain types of masculinities and femininities seem to emerge from these power differentials. It is the construction of this gendering within the context of the Physical Sciences classroom that is of specific interest to me, especially since the science taught is often experienced as 'difficult', abstract and decontextualised. An analytical study of these gendered power differentials will go beyond anecdote and my subjective experiences

will contribute to an understanding of power discourses as well as how learners construct their gendering. This interest has also been fuelled by other studies that have described particular constructions of gender in Primary School settings (Bhana, 2002; Francis, 1998; Nzimakwe, 2008) and the performances of heterosexuality in a Primary School context (Renold, 2000).

1.4   THEORETICAL AND CONCEPTUAL FRAMEWORK

This study was underpinned by a specific position with regard to worldview, philosophy, principles and theory.

Taking the worldview that our perceptions shape our thinking and our constructs and conceptualisations influence our behaviour, the way we think about gender influences our behaviour (Dillabough, 2001, p.11). Illuminating discursive gender constructions will go a long way in stimulating discourses, through revisiting traditional notions and accepted beliefs about gendering (Dillabough, 2001, p.15; Francis, 2001). Underpinned by a philosophy of interpretivism, learning is understood as being influenced by social relations (Francis & Skelton, 2005, p.30). This in effect implies that teaching and learning are affected by our perceptions of social actions as well as how they acted out in unique social settings. In addition, our social actions are influenced by the power/knowledge of what and how we learn (Paechter, 1998, p.27). This study is based on the premise that learning science is both a social practice as a well as an individual cognitive process. Based on this principle, by drawing attention to the power discourses in a Physical Sciences classroom, teaching and learning could be viewed through the lens of the social practices that construct subjectivities, providing an insight into the ways in which the boys and girls position themselves in gendered ways.

Underpinned by Foucault's poststructuralist theory on power, this study is premised on multidimensional perspectives of power with power relations being asymmetrical (Foucault, 1980). Within this framework, power is described both in terms of multiplicity and particularity, where meaning is socially constructed (Foucault, 1980). It is this socially constructed meaning and the shaping of the constructions of boys' and girls' gender, in a specific context, that is the focus of this study. Gender is viewed as a performance, a 'doing' (Butler, 1993, p.33) where masculinities and femininities are relational (Connell, 1995, p.21).

1.5   RESEARCH QUESTION

In order to examine learners' constructions of gendering in the context of a Physical Sciences classroom, this study attempted to answer the following key question:

"What performances do the girls and boys engage in as they construct their

gendering in the grade 10 Physical Sciences classroom?"

1.6   THE RESEARCH DESIGN AND METHODOLOGY

In this study, the research design and methodology were underpinned by poststructural feminism (Foucault, 1980). From a poststructural perspective, constructions of gender can be conceptualised through an analysis of power, which operate through the discourses of resistance and contradiction (Foucault, 1980). In this study, the construction of gender was explored through an analysis of the researchable relations of

power. Hence, underpinned by poststructural feminism, I was able to permit gender to shape the methodological principles of this study.

Further, poststructural feminism enabled the use of a qualitative approach to understand gender constructions (Paechter, 2001, p.43). This methodology was most appropriate for my research as it enabled me to observe gendered relations within the natural context of the classroom. Through a qualitative approach, meanings and understandings were sought rather than proof. Hence, qualitative research enabled a study of power relations in the construction of gendering, as a human phenomenon.

This research troubles particular relations of power in a particular classroom context. I acknowledge that other aspects such as the school culture, teacher approach and expectations, peer group dynamics, race, culture, social and economic class are part of and feed into the web of interactions. Due to the parameters of this study, I have resolved to focus on just one aspect, that is, the discourse of power. Specifically, I focus on relations between learners, between learners and the science being studied as well as how this contributed to the construction of their gendering in that classroom. This study does not seek generalisation beyond the sample in question, that is, a grade 10 Physical Sciences classroom at *New Dawn Secondary* (pseudonym), a school from the Umlazi Township in Durban.

1.7 THE RESEARCH METHOD AND THE RESEARCH INSTRUMENTS

A case study is the study of an instance in action within a bounded system, such as a classroom (Cohen, Manion, & Morrison, 2000, p.181). This method was appropriate for

my research because it enabled an understanding and interpretation of the world in terms of the learners in the context of a particular Physical Sciences classroom.

The Physical Sciences classroom was observed for two weeks and this was followed by interviews. During the lesson observations, detailed field notes were taken. A selection of four girls was interviewed individually, followed by an interview of girls only as well as an interview with both boys and girls. Both the observations and the interviews revealed rich data about the discourses of power and its contribution to the construction of gendering.

The piloting of my initial observation schedule confirmed that what may be appropriate was an open-ended observation schedule. The data generated from the observation schedule helped reshape and refine the questions of the semi-structured interview schedules. During the observations, I was able to establish my credibility and earn the trust of the learners. During the interviews, I paid particular attention to the framing of questions and the use of prompts and probes.

1.8   THE SAMPLE

The selection of *New Dawn Secondary School* was both convenient and deliberate. It was convenient because it was easily accessible to me and I was familiar with the management of the school. The selection of the school was deliberate because it is part of the National Department of Education's Dinaledi initiative. Nationally, over 500 focus schools are the target of a program crafted to support the teaching and learning of Mathematics and (Department of Education, 2005, p.3). Ultimately, the aim is to develop these schools to become centres of excellence for the teaching of Mathematics

and . One of its objectives of this initiative is the increasing of participation and performance of African, especially girl learners, in Mathematics and . In addition, the selection of a classroom where the National Curriculum Statement is being implemented was also deliberate. Here, the curriculum emphasises learner centeredness and sensitivity to issues of gender amongst its focus areas (Department of Education, 2002, pp.5-8).

In this study, I make use of the categories 'girls' and 'boys' to describe the young adults in the Grade 10 Physical Sciences classroom because these were the categories that they used to describe themselves. A grade 10 class was selected because, I believe, that here the learners are at a stage of puberty where they are starting to find their identity, are linguistically competent and articulate, and are not pressurised by exit examinations. The grade 10 Physical Sciences class consisted of twenty-two girls with their ages ranging from fifteen to sixteen years and nineteen boys with their ages ranging from fifteen to eighteen years. I did not specifically select the sex of the teacher since I believe that either sex could foreground interesting dynamics in terms of gendered construction. Furthermore, the intention of this study was to draw attention to the performances of the girls and boys as they constructed their gendering in a Physical Sciences classroom.

1.9 CONSENT AND ETHICAL ISSUES

Gaining access and obtaining informed consent was the starting point for my interactions in the field. Permission to do research at the selected school was sought from the KwaZulu-Natal Department of Education (Appendix 1.1). A letter was then sent to the Principal and Governing Body of the school requesting permission to

conduct research at the school (Appendix 1.2). In this letter, the details of the study were explained, such as the rationale and the methods to be used. The benefits of the study, that is, how it may lead to a better understanding of the complex interactions between girls and boys and how this can influence their learning in class, was also explained. In addition, commitments to minimum disruptions to the lessons were made. In obtaining consent, it was also mentioned that the learners' participation was voluntary and that they may withdraw from the research at any time. Similarly, in the letter sent to parents, consent for learners' participation in the study as well as ethical issues were discussed (Appendix 1.3). All of the afore-mentioned ethical issues were also discussed with the learners in my first interaction with them.

1.10   LIMITATIONS OF THE STUDY

While in participant observation the researcher aims to blend in and become one with the sample (Cohen et al., 2000, p.187), I found that this was not possible as an Indian adult female amongst young African boys and girls. Hence, my presence as an obtrusion cannot be ruled out. In addition, since the participants were informed that they would be observed, there is that possibility that they may behave differently during the observations. Hence, issues of validity and reliability became important in the data gathering. The study of a single classroom over a short period was a limitation. However, this study did not seek generalisation and I was confined by the parameters of a small-scale study. During the interviews, even though I spoke clearly and slowly, I was mindful of interviewing first language IsiZulu speaking learners. This may have been a constraint in understanding each other. The period for interacting with the learners was also a constraint since I aimed for minimum disruptions to their school day. Finally, since I was dealing with the sensitive issue of gendered relations, learners

could have held back information, which they thought could have affected their relations.

1.11   STRUCTURE OF THE DISSERTATION

The structure of the dissertation is as follows:

Chapter One (1) discusses the introduction, background and purpose of the study; as well as a statement of the Research Question. This is followed by a discussion of the theoretical and conceptual framework of the study. The research design, methodology and method are also introduced here. This Chapter ends with the limitations of the study and a breakdown of the chapters.

Chapter Two (2) provides a review and analysis of literature on gender research and the theoretical framework employed. I begin with a review of South African research and I thereafter elected to review related literature under the various theories that underpin this study. Starting with a discussion on gender theories, I explore the theoretical framework of this study. The relevance of theories such as the dynamics of power, gender as a performance and the constructions of masculinities and femininities are discussed. This Chapter concludes with a discussion of a poststructuralist feminist theoretical orientation and its relevance for my study.

In Chapter Three (3), I turn my focus to the research design, methodology and method, while justifying my methodological choices. The Chapter begins with a discussion of the theoretical underpinnings of the design and methodology; and details the sampling, issues of ethics as well as validity and reliability.

In Chapter Four (4) I present, interpret and analyse the data collected. The results are discussed with reference to the theoretical framework and related literature deliberated in Chapter Two. The themes emerging from the analyses are then discussed.

Chapter Five (5) presents the conclusions of the study on the performances girls and boys engage in as they construct their gendering. The presentation of the conclusions is followed by recommendations towards addressing gender equity in the education of boys and girls.

1.12   CONCLUSION

This dissertation investigates the performances girls and boys engage in as they construct their gendering, through examining the researchable relations of power in a grade 10 Physical Sciences classroom. In this Chapter, as an introduction, I explained the purpose and rationale; the conceptual and theoretical framework; as well as the research design and methodology of this study. The next Chapter presents a review of relevant literature and outlines the theoretical framework that guides this study.

CHAPTER 2

A REVIEW OF LITERATURE AND

THEORETICAL FRAMEWORK

The previous Chapter outlined the background and introduction to the study. In this Chapter, in order to contextualise the study, I begin with a review of related research in South Africa. I then introduce and expand on the theories of the dynamics of power as well as the performances and constructions of gender, with specific reference to gender in schools. Finally, I locate my study within a poststructuralist feminist orientation.

2.1 INTRODUCTION

The purpose of this study was to examine the learners' gender constructions in a grade 10 Physical Sciences classroom, through examining the researchable relations of power. This is important in order to understand whether or how these discourses legitimise discursive gendering practices and how contexts contribute to the formation of masculinities and femininities. Classrooms can then be understood as complex sites, offering spaces for resistance and agency. Using a feminist theoretical orientation, I draw on poststructural theories to problematise gender in order to examine the discourses of power in classrooms.

2.2 RESEARCH ON GENDER ISSUES IN SOUTH AFRICA

In South Africa, much of the work on gender and education in this field has been located in the contexts of HIV and Aids (Moletsane, Morrell, Unterhalter, & Epstein, 2002). Linda Chisholm and Elaine Unterhalter allude to the gaps in discourse analysis

and map the development of gender theories, policies and education in South Africa (Chisholm & Unterhalter, 1999, pp.3-8). They have identified significant gaps, firstly, in the research on the constructions of gender at the school level and secondly, with the development of educational policies that focus only on access by girls and the removing of barriers to education. The authors identify three areas of research and policy development in South Africa: women and development; gender and development and the poststructuralist approach to gender and education. Women and development is premised upon equal opportunity for women and on the belief that the real problem was with the oppressive barriers to women's employment and development. Gender and development, however, focused on the relationship between men and women and the entire social, economic, political and policy impact on both men and women. Both approaches did not give due emphasis to schooling sites as being highly generative. The literature suggests that a shift to a poststructuralist approach saw a focus on subjectivities with the aim of problematising constructions of gender.

I begin with the work of Robert Morrell (1992, p.2) who has argued that simply removing barriers to girls' education cannot account for their problems in schools and that understandings must move beyond equal access to education and focus more on the quality of education received. The research of the early 1990s in South Africa saw a focus on women and how they were oppressed by institutional and structural power (Chisholm & Unterhalter, 1999, p.8). A significant gap in the research of this period was a focus on the power wielded by women as subjects of constantly shifting power. This was highlighted by Robert Morrell (2000, pp.226-230) who argued that while the focus on girls and women in education is legitimate, studies on masculinities have been neglected and that power is not linear with only boys and schools acting against girls.

Thus, Morrell's (2000) focus on girls as not the only victims in power relations, was an important development in the field of gender and education in South Africa.

Recent South African research within the poststructuralist framework include the work of Dheevia Bhana (2002) on the construction of masculinities and femininities and how the discourses of early schooling inscribed gender identities. In particular, Bhana (2005) explores violence and the negotiation of masculinities among young "black" school boys in South Africa. In this study, the violent masculinity had achieved a position of hegemony in the Primary School studied, but it was contested and unstable. Gender constructions in a Primary School was also explored by Nzimakwe (2008) but a significant gap in South African research is the exploration of gender constructions in secondary schools, especially science classrooms. While the aforementioned studies were conducted in Primary Schools, this study focuses on the Secondary School context.

2.3   THEORISING GENDER

In this Section, I focus on theorising gender through a discussion of the discourse of power, gender as a performance and the construction of masculinities and femininities.

2.3.1   THE DYNAMICS OF POWER

I align myself to the work of the discourse theorist, Michel Foucault (1980), who to me best exemplifies poststructural thinking. He places the concept of absolute 'truth' in doubt and asserts the plurality and constructed character of meaning in which 'truth' is a performative exercise established by its links with power. Foucault (1980, p.37) maintains that power is not something that one 'has', neither is it lodged in any

privileged group of people or locations. Rather, it is exercised in actions. He theorises that power is multiple, relational and fluid, residing in relations rather than being owned. Working within a poststructural framework, Foucault argues that power can be productive and not merely coercive, that is, it can construct subjectivities or identities. Foucault's work is most useful in the explicit analysis of social relations, the exclusionary effects of power as well as the questioning of connections between legitimated knowledges. Of interest to my research, is that Foucault's approach locates the body as a significant site for the operation of power (Foucault, 1980).

However, significant gaps in Foucauldian theory exist. For example, he is not clear about the specific functioning or the limits of power nor is he lucid about the origins of power and its transformations. In addition, Foucault does not speak specifically about masculinities & femininities and how they are constructed within discourses of power; neither does he allude to the concept of hegemony (Foucault, 1980).

Discourses are intimately involved with power relations, such that some discourses are more powerful than others (Foucault, 1978, p.28). The self is not fixed but is positioned in discourse (Foucault, 1980, p.45). Discourses wield power by constructing objects in different ways and hence, individuals can simultaneously undergo and exercise power, and be positioned in different ways at different times depending on the discursive environment (Francis, 2001). Resistance is also inseparable from power; wherever there are power relations there are also relations of resistance (Paechter, 2001, p.48). Foucault's (1978, pp.95-96) work on power and resistance allows us to retain a place for human agency with respect to power relations as well as to see how the

deconstruction of discourses play an important role in the construction of resistant counter-discourses.

My own view of power follows that of Carrie Paechter (1998) which is based on Foucault's thinking: "Gender is socially constructed in a way that involves or includes an unequal power relation, such that, while there are differences within genders, it is mainly males who have access to, enact and embody power" (p.55). In other words, power is often gendered. Further, power is inscribed "in our ways of being and in the spaces we inhabit" (Paechter, 1998, p.55). Paechter (1998; 2001) explores the relationship between power/knowledge and the curriculum. She also deconstructs hegemonic discourses such as the positioning of the female as 'Other', as a deviation from the 'normal' male 'Subject'. Here, she interrogates the use of the male as the 'normal' point of reference to which the female is compared and contrasted.

In contrast, traditional Marxist approaches on power relations within educational institutions is in contradiction to my position on power relations, since it describes education as a bourgeois institution that places the teacher in a position of power from which they can oppress children, who are institutionally powerless (Paechter, 1998, p.55-58). I am in agreement with Valerie Walkerdine's (1990, p.3) assertion that girls may also be the source of power differentials, often through their resistance which may not always by revolutionary but may be reactionary. She theorises that girls are not "unitary subjects uniquely positioned", but are produced as a nexus of subjectivities, in relations of power which are constantly shifting, rendering them one moment powerful and at another powerless (Walkerdine, 1990, p.4).

2.3.2   GENDER AS A PERFORMANCE

In "Doing Gender", the groundbreaking article by Candace West and Don Zimmerman (1987), they argue that "gender is not a something we are, but something we do" (p.125). Thus, gender is an emergent aspect of social interactions. Judith Butler (1990, p.33) extends this concept to theorise gender as a constantly negotiated performance.

Performing gender is not straightforward (Butler, 1990, p.34). The use of binaries such as male/female often prevents us from seeing the full range of diversity and differentiation that exist (Butler, 1993, p.140). Males and females are actively involved in the production of gendered identities, constructing gender through a variety and range of social processes (Butler, 1990, p.33). According to Butler (1990, p.34), gender as a performance is not a fixed category. She adds that gender is not a noun but a "being" and as an ongoing discursive practice, it is open to intervention and resignification. According to Butler (1990) gender is the "repeated stylization of the body, a set of repeated acts within a highly regulatory frame" (p.33). Masculinity and femininity are inscribed on the body and this emphasises the performative nature of gender roles. Hence, gender as performative implies that it is achieved, worked on, something that is not natural (Butler, 1990, p.33). In order to preserve a sense of gender identity, individuals have to perpetuate and regulate their performances of gender roles as deemed appropriate by society. In this way, gender as a 'doing' becomes context dependent, that is, gender is achieved according to socially constructed categories. In other words, the performance of gender, according to Butler (1993) is a "re-enactment and re-experiencing of a set of meanings already socially established" (p.121).

Francine Deutsch (2007, pp.107-108) alerts us to the concept of "doing gender" in that it may inadvertently perpetuate the idea that the gender system of oppression is "impervious to real change". She adds that if gender is constructed, it can be deconstructed. Deutsch (2007, pp.122-123) calls for a shift of focus from "doing gender" to "undoing gender" by emphasising the social processes of resistance and change in power dynamics. This entails an understanding of the way contexts, such as the dynamics of classroom space, work in the construction of masculinities and femininities.

2.3.3   CONSTRUCTIONS OF MASCULINITIES AND FEMININITIES

Masculinities and femininities are performative acts of gender (Butler, 1990, p.141). Masculinities work as an unspoken standard, as a style (Lesko, 2000a, p.xvii). Particular masculinities, according to Lesko (2000a), are profoundly intertextual: "...they are constructed, performed and revised across knowledges, symbols, styles, subjectivities and norms" (p.xvii). In addition, masculinities are multiple and are historically and contextually dependent (Weaver - Hightower, 2003, p.480). Schools are sites where multiple masculinities are played out (Bhana, 2005, p.207; Mac an Ghaill, 1994; Skelton, 2001, p.24). The ways in which boys enact their masculinities are dependent upon access to power (Bhana, 2005, p.207; Mac an Ghaill, 1994). The context and the available cultural resources set the limits in the making of masculinities (Bhana, 2005, p.207). Multiple versions of masculinities may constantly struggle for dominance (Mac an Ghaill, 1994, pp.90-101) but it is the dominant group that achieves a position of hegemony (Connell, 1995, pp.183-188).

Hegemony is a concept originating in the work of Italian socialist Gramsci (Connell, 1995, p.184; Paechter, 1998, p.2). It was a concept designed to explain how a dominant

class maintains control by projecting its own particular way of seeing social reality so successfully that its view is accepted as common sense and as part of the natural order by those who in fact are subordinated to it (Paechter, 1998, p.48). Hegemony is thus inherent in social practices, forming part of the 'norm' (Connell, 1995, p.186). It determines which discourses are most binding and accepted without question (Connell, 1995, p.186). Hegemonic forces operate in such a way that they can make individuals the agents of their own oppression, for example, girls who believe in the discourse of female deficit in mathematics are likely to give up trying to succeed (Walkerdine, 1990, p.29). Hegemony serves to perpetuate the status quo and is effective in supporting prevailing power relations (Foucault, 1978, p.28).

The concept of hegemony can be extended to explain the dominant and persistent masculinity that manifests in gender relations (Skelton, 2001, pp.23-30). Hegemonic masculinities are the pervasive, popular forms of masculinity which are practiced across discourses and social contexts (Connell, 1995, p.184). Hegemonic masculinity is not a fixed character type but is the masculinity that occupies the hegemonic position in a given pattern of gender relations, a position that is always contestable and hence changeable (Skelton, 2001, p.29). Implicit in the concept of a dominant masculinity is the subordination of other masculinities (Gilbert & Gilbert, 1998, pp.50-51). In fact, the exalted form of masculinity occupies this position because it oppresses and marginalises other forms of masculinities. Connell (1995, p.5) defines hegemonic masculinity as the "culturally exalted form of masculinity". The patterns of conduct associated with hegemonic masculinity are usually authoritative, aggressive, heterosexual and competitive (Connell, 1995, p.183; Gilbert & Gilbert, 1998; Lesko, 2000a, 2000b; Mac an Ghaill, 1994).

A conspicuous gap in the literature is a discussion on the possibility of a hegemonic femininity; what constitutes dominant femininities; as well as their relations with other femininities and masculinities. Connell (1987, p.296) offers an explanation for this. Hegemonic masculinity is constructed in relation to various subordinated masculinities as well as in relation to women (Connell, 1987, p.298; 1995, p.183; 1996, p.297). Connell (1987, p.298) maintains that there is no hegemonic femininity in the sense that the dominant form of masculinity is hegemonic among men. There are, however, forms of femininity that are clearly defined. One form is defined around compliance with subordination and is oriented to accommodating the interests and desires of men (Connell, 1987, p.299). Connell (1987, p.299) calls this is the "emphasised femininity". He adds that other forms of femininity are defined by strategies of resistance or non-compliance. What is required is a closer look at the construction of femininities.

The contemporary concern with a 'crisis in masculinity' has eluded in-depth scrutiny of what is happening to girls and women (Reay, 2001, p.128). At a time when masculinities appear to be an increasing preoccupation within education, it has become important to refocus and question how femininities are regulated in particular contexts. To begin with, femininity is the process through which girls and women are gendered and become specific sorts of female (Lesko, 2000a). However, "being and becoming, practising and doing femininity are very different for different classes, races, ages and nations" (Reay 2001, p.153). She argues that there are different formations of femininity. What follows, is that femininity is not a unified discourse, although dominant forms of femininity are often regarded as obvious and taken for granted. For example, it is generally believed that all women are caring and nurturing (Reay, 2001, p.129). In contrast to such understandings, femininity is dynamic, various and changing,

hence making way for multiple femininities (Butler, 1993; Paechter, 2006b). Femininities are best understood as being in process, constantly being made and remade in different contexts (Butler, 1993). There have been significant shifts in the construction of femininity, which have extended generally held understandings of acceptable behaviour. Recently, the notion of an active, powerful femininity which is sexually assertive has emerged (Walkerdine, 1990). Similar to the construction of masculinities, the construction of femininities vary according to differentials of power (Connell, 1987, p.183; Reay, 2001, p.128).

The construction of masculinity and femininity is relational (Connell, 1995, p.298) as well as dualistic (Paechter, 2006a, 2006b). The construction of masculinity and femininity is relational in that they are both constructed relative to one another where they exist because of each other. Further, masculinity derives its power through its relation to femininity. The concept of duality is explored by Paechter (2006b, p. 256) who maintains that a dualistic relation is one in which the subordinate term is negated rather than the two being equal. She defines femininity as a lack or absence of masculinity. There can be no hegemonic femininity because being in a hegemonic position is also about being in a position of power (Connell, 1995, p.183; Paechter, 2006b).

Reay (2001, p.123) argues that within educational contexts, with the growing emphasis on measured outputs and competition, it is primarily the assertiveness and authority of masculinity rather than the aesthetics of femininity that is required and rewarded. Walkerdine (1990, p.43) argues that the entry of girls into masculine norms of rational academic excellence "comes at a price". She explains that powerful associations of

cleverness and "unfemininity" still abound. Girls are caught up in the delicate act of balancing femininity and cleverness, where being feminine cannot be allowed to interfere with academic success (Reay, 2001, p.154). This requires a huge investment in which femininity has to be struggled over and sexuality is sometimes renounced. Hence, academic success is produced out of the suppression of aspects of femininity and sexuality. Reay (2001, p.153) found that primary school girls took up various positions in relation to traditional femininities. She found that all the girls at various times acted in ways that bolstered boys' power at the expense of their own. Here, the 'emphasised femininity' accommodated the interests and enhanced the status of boys in the class. However, along such compliant forms of femininity were other forms that were more resistant and empowering for girls (Reay, 2001, p.153). In summary, the construction of masculinities and femininities are relational and context dependent. I now focus on schools as one such context.

2.4   GENDER IN SCHOOLS

In the context of schools, particular forms of gender are performed and (re)produced. The constructions of these genders are influenced by, and in turn influence the use of space. Within this space, as a reflection and extension of society, some schools are marked by gendered violence. In addition, the nature of school science in particular settings has implications for gendering. The use of space, gendered violence and the nature of school science are some of the contexts that influence the construction of masculinities and femininities in schools.

2.4.1   GENDERED SPACE

Following Connell's (1995, p.15) argument that masculinities and femininities are produced in "body-reflexive practices", bodies become both agents and objects of practice where bodies "move, occupy, produce, negotiate and transgress spaces" (Nespor, 2000, p.29). Bodies generate spaces and are also constituted by their spatiality (Nespor, 2000). From this perspective, gender becomes the performative accomplishments of particular articulations of space and time (Butler, 1990). Nespor (2000) extends this argument of the performance of gender in space to the production of space, by stating that the "production of space, like gender, is a performative act, naturalized through repetition" (p.31).

Tuula Gordon (2006, p.2) maintains that in the everyday life at school there are tensions between control and agency for girls. In her ethnographic study, the girls encountered practices whereby their use of space was controlled. The girls had high expectations of schooling and entered educational spaces with the expectation of attaining rational individuality as learners capable of exercising their agency (Gordon, 2006. p.3). However, they found that they entered a space that frequently reminded them of their gender (Gordon, 2006, pp.1-3). Here, the girls' use of space was curtailed, their embodiment controlled and their voice became inappropriate while their ability to do and act became circumscribed (Gordon, 2006, p.6). So, for girls to exercise their agency, their spatial locations as embodied subjects become significant, since agency has to take place somewhere, in some context. Male domination of space and time is also noted by Paechter (1998, p.21) where boys tend to dictate where and how girls move in the classroom. Hence, boys control of space is one of claimed entitlement (Thorne, 1993, p.83).

Paechter (1998, p. 10) extends the control of space to the concept of the "gaze" to which the 'Other' is subjected. She adds that the objectifying 'gaze' serves to police and discipline girls' behaviour in a number of ways. For example, adolescent girls are subjected to the disciplinary 'gaze' where their sexuality is controlled by the attitude and behaviour of boys (Paechter, 1998, p.9; 2006b, p. 257). Paechter (1998, p.10) adds that schools as institutions subject learners to the 'gaze' in a way that makes their bodies get in the way of their education. The Cartesian understanding of identity is that identity is located in the mind and schooling becomes preoccupied with influencing this identity (Paechter, 2006a, p.121). She adds that the main feature in which bodies feature in schooling is as 'things' to be policed, to be subdued and excluded so that we can get on with the main purpose of schooling, the education of the mind. Since the mind is the focus of education, a considerable part of the energy of the schooling system has to go into disciplining and confining the bodies of learners so that they cannot interfere with the main purpose of schooling which is about the mind (Paechter, 2006a, p.127). To this end, schools organise learners' bodies both spatially and temporally (Paechter, 2006a, p.127).

2.4.2   MASCULINITIES AND FEMININITIES IN SCHOOLS

Schools are one of society's most powerful socialising forces that foster and support societal stereotypes for gender behaviour (O'Reilly et al. 2001, pp.18-19). As institutions reflecting society, schools play a significant role in the development of multiple forms of masculinities and femininities (Skelton, 2001, p.49).

Nilan (2000, pp.66-68) concludes that masculinity and femininity are above all a social identity accomplishment. Dominant masculinities are a constitutive part of conventional, masculine identities of schools that have resulted in the prevalence of macho cultures (Davison & Frank, 2006, pp.153-156). This masculinity is powerful and predominantly defined through the exclusion and oppression of those actors by whom it feels threatened (Jackson, 1998, p.80). Often this means buying into a culture of aggressive, heterosexual manliness which deliberately rejects school learning as an unmanly activity (Jackson, 1998, p.81). Sewell (1998, p.112) found that in the macho cultures of some African-Caribbean school boys there existed a complex combination of compulsory heterosexuality and misogyny and to preserve their threatened manhood, they had a cool indifference to their school work.

Within a range of masculinities prevalent in schools, certain versions are promoted and heralded, while others are devalued, ignored or even erased (Gilbert & Gilbert, 1998, p.51; Letts, 2001, p.264; Mac an Ghaill, 1994, p.21). Male dominance is regulated, normalised and legitimised and certain enabling environments may promote the ascendance of the hegemonic masculinity (Connell, 1995; Epstein & Johnson, 1998; Gilbert & Gilbert, 1998; Letts, 2001, p.264; Mac an Ghaill, 1994, p.21; Skelton, 2001, p.27). This context-bound hegemonic masculinity may re-create a gender among children where the larger social relations of men's dominance are learned, employed and reinforced (McGuffey & Rich, 1999, p.625)

Regarding the construction of femininities, Becky Francis (1998, pp.24-57) found that in Primary Schools, girls constructed the femininity as "selfless and sensible" in opposition to the boys' "selfish and silly" masculinity. However, in her research with

secondary school learners, she found that a dominant construction of femininity as sensible and masculinity as silly and selfish was just as evident as in the primary schools, although the sensible/silly construction had been reconfigured as maturity/immaturity (Francis, 1998). In addition, the girls were praised for being dutiful rule-followers while the boys' disruptive rule-breaking behaviour was not discouraged but covertly accepted (Francis, 1998). O'Reilly et al. (2001) add that schools reinforce one of society's loudest and clearest messages and that is at puberty girls must "give up their self and begin lessons of becoming sex objects" (p.24).

The central process which often promotes gender inequality is the objectification of girls (Eder, 1997, p.4). Boys typically perceive their female peers as passive sexual objects rather than as sexual actors in their own right (Eder, 1997, p.7). In schools a range of masculinities and femininities are developed and practiced, sometimes in opposition to the school culture and often in 'difference' (Epstein & Johnson, 1998, p.108). Intersections and contradictions between the performance of masculinities and femininities often manifest as gendered violence (Eder, 1997, p.17).

2.4.3 GENDER-BASED VIOLENCE IN SCHOOLS

Schools, as powerful socialising agents, collude in (re)producing the 'norms' of society, such as violent gendered behaviour (O'Reilly et al., 2001, pp.18-19).

Shakeshaft (2000, pp.75-77) examined gendered violence in schools and concluded that bullying, harassment and sexual harassment are neither precise nor mutually exclusive. No matter what the label is, the actions are "toxic to learning" and harm both the harasser and the target (Shakeshaft, 2000, p.96). She further explains that 'bullying' and

'harassment' can include any behaviour that intends to hurt or upset where the more powerful attacks the less powerful. According to Shakeshaft (2000, p.97) what bullies and harassers do in primary school transforms into sexual harassment in high school. To illustrate the range of behaviours that constitute gendered violence in schools, Shakeshaft (2000) has classified them into visual, verbal and physical. Often these behaviours are dismissed as normal adolescent behaviour (Paechter, 1998; Shakeshaft, 2000). She adds that the difference between behaviour that is flattering and that which is frightening depends both on the context and on the performers. Although there is no physical contact between the perpetrator and the target in both visual and verbal gendered violence, both are harmful and denigrating (Shakeshaft, 2000). Teasing, a prevalent form of criticism among children, has powerful emotional and behavioural consequences for gender relations (Thorne, 1993, p.53). Teasing and labelling often evokes feelings of discomfort and humiliation (Shakeshaft, 2000). Contact sexual violence includes touching and is commonly referred to as sexual abuse (Paechter, 1998, p.23).

2.4.3.1   GENDER- BASED VIOLENCE IN SOUTH AFRICAN SCHOOLS

The South African society is fraught with incidents of violence against women (Memela & Edwards, 2009, November 10). Here, the social norms are so pervasive and insidious that it has become a way of life (Memela & Edwards, 2009, November 10). The Human Rights Watch (Human Rights Watch, 2001) concluded that: "One of the greatest threats to a South African girl's safety at school is likely to be seated next to her in class" (p.48). The Human Rights Watch Report (Human Rights Watch, 2001) abounds with examples of sexual violence against girls in South African schools by both learners and teachers. Further, a number of reports, studies, personal anecdotes and newspaper

accounts indicate that gender-based violence which is very prevalent in South African schools is a key barrier to equality in schooling in South Africa (Human Rights Watch, 2001; Mlamleli, 2000). Mlameli (2000) adds that "Jackrolling" is a growing form of gendered violence directed at girls. This practice is a ritualistic display of male power through the forceful abduction and gang rape of young women, especially school girls (Mlamleli, 2000, p.5). Males are also victims of gender based violence where males who do not appear to subscribe to aggressive forms of masculinity are at risk (Morrell, 1998, pp.218-221). The South African Gender Equity Task Team concluded that gender-based violence constrains the freedom of movement, choices and activities of its victims (Wolpe et al., 1997, p.89). It often results in intimidation; poor levels of participation in learning; low self-esteem; school drop-out; or other physical, sexual and/or psychological damage (Wolpe et al., 1997, p.93). It erodes the very basis of equality education (Mlamleli, 2000, p.6). Violence against girls is prevalent in South African schools and these are the places where behaviour is shaped (Pandor, 2005, p.21). Arnot (2000, p.293) calls for a form of egalitarian politics, which needs to respond to the differentiation between powerful and subordinated groups with the aim of foregrounding the voice of the 'Other'.

2.4.4   GENDER AND THE NATURE OF SCHOOL SCIENCE

Science is grounded in abstract and systematic theory and is fundamentally hierarchical (Fox, 2001, p.655). In keeping with its hierarchical nature, Fox (2001, p.657) argues that it is marked by immense inequality in status and rewards; and the valued attributes of science such as rationality and control have been more ascribed to men than women. Science also connects with powerful social institutions, for example, education. This makes school science a strategic site for the study of gender because it reflects and reinforces gender stratification (Fox, 2001; Letts, 2001, p.261; Paechter, 1998).

The gender stratification of school science is manifest in the way it structures and is structured by the norms of heterosexual masculinity (Letts, 2001, p.261; Paechter, 1998). These norms comprise a "hidden curriculum" in science classrooms (Wolpe, 1988, p.89). Letts (2001) maintains that while there are delights and pleasures many learners receive from school science, others experience "betrayals and errors" (p.261). He argues that school science can serve as a heteronormative masculinising practice and learners construct identities that are consonant with this practice. Letts (2001, p.261) defines heteronormativity as that which takes institutional, political and social manifestations of heterosexuality to be the unmarked norm. While schooling is complicit in the construction of certain masculinities, Letts (2001) proposes that school science reinforces hegemonic heterosexual masculinity, but in ways that are neither "monolithic nor unambiguous" (p.261). He adds that although this hegemonic masculinity is most powerful, it is often not very visible. Despite the fact that hegemonic masculinity by its very nature victimises, silences and oppresses, boys are very much victims of its untruths, as are girls (Connell, 1995, p.18). Many boys and girls continue to embrace school science and are "seduced" by it, while many others reject it (Letts, 2001, p.262). In order to understand how school science fosters the propagation of certain hegemonic heterosexual masculinities, the practices that create the science as male and objective needs clarification.

Science has been critiqued for its androcentric epistemology, sexist language, masculinist structure and methodologies (Murphy & Whitelegg, 2006, pp.291-293). This *enlightenment* science, which is still taught in schools, continues to function as a regime of truth (Foucault, 1980, p.73). This science is far from value-neutral or

acultural but is distinctly abstract and formal (Foucault, 1980; Letts, 2001, p.263). Letts (2001) argues that the success of modern science is located in its internal features, that is its experimental or scientific methods, which actually maximises its objectivity and rationality. Letts (2001) concludes that "covered by the cultural fingerprints of their creators, modern sciences are genealogies of the people and histories that have preceded us" (p.263).

This culture-laden nature of science has many effects in the classroom (Letts, 2001, p.264). Gilbert and Gilbert (1998, p.19) note that while male sport serves as a representation of brute power and strength of the physical body, mathematics and science serve as the representation of rational power and mental strength of the male mind that dominate classrooms. School science encourages competition through emphasis on rationality and expertise rather than through physical confrontation (Gilbert & Gilbert, 1998, p.19). The traditional image of science as unemotional, detached and politically unbiased, has been the focus of feminist critique but this has not necessarily changed the ways of 'doing science' in classrooms (Gilbert & Gilbert, 1998, p. 20). Traditional views still predominate in schools, where science serves the interests of the technocratic elite (Driver et al., 1996). Learners still view scientific claims as absolute, theories as unproblematic reflections of the 'truths' in nature, and science to be an individual undertaking that is disconnected from their lives (Letts, 2001, p.267; Murphy & Whitelegg, 2006, p.282). The hegemonic hetero-masculinist nature of school science masks an insidious but invisible misogyny making both girls and boys its victims (Letts, 2001, p.264). In addition, learning science is an embodied activity that interacts with other discourses such as gender (Barton & Brickhouse, 2006, p.222). The complexities of gender, the many ways in which they are enacted and

embodied in science classrooms and the ways in which these intersect with 'doing science', becomes important (Murphy & Whitelegg, 2006, p.283).

School science functions as a "grand narrative that seduces both learners and teachers" (Letts, 2001, p.265). This metaphor is useful for envisioning the largely implicit ways in which school science may attract or repel certain learners. The notion of seduction carries with it a whole set of relations, which shape and are shaped by realms of knowledge such as that of school science (Letts, 2001, p.265). Letts (2001, p.264) argues that many interactions in the science classroom enact a masculinist notion of objectivity, for example, when learners have to 'discover' certain 'truths' about scientific principles. He adds that the learners are positioned as outsiders to the school science they are engaging with because their focus is mostly on the physical event rather than the explanations for events. Hence, their involvement in this seduction with the 'truth' positions them as outsiders to scientific understandings (Letts, 2001, p.265). Walkerdine (1990, p.211) asserts that one of the barriers to girls learning science is its organisational characteristic. The organisational characteristics of science, such as its competitive and individualistic nature, objectivity and value-free inquiry play important roles in diminishing the resilience of girls in science, where they are positioned as outsiders. In addition, through seduction by the 'truths' of science, learners learn to believe that Western science is rational, progressive and objective.

Carlone (2003, pp.17-34) focused specifically on girls' participation in the normalising discourse of science. She found that their participation reproduced prototypical meanings of science as authoritative and science learners as dutiful. This acceptance of the social practices in science classrooms may indicate an approval of the value school

science knowledge provides to those who diligently pursue it (Carlone, 2003, p.18). Everyday science classroom practices in a traditional, teacher-directed classroom imply meanings of science as a rule-based, discrete body of knowledge and objective, which are representative of prototypical school science (Carlone, 2003, pp.20-22; Letts, 2001, p.272). Further, when learners find that science is difficult, authoritative and inaccessible, they encounter a meaning of science that is prototypical (Carlone, 2003, p.20). In most typical science classrooms, science activities such as listening, observing and verifying 'truths' result in learners mastering a given body of knowledge. According to Driver et al (1996, p.18) these activities reinforce the authority of both the science and the science teacher. The authority of the science teacher is fortified by the use of questioning patterns where questioning is used to test the learners' mastery of the knowledge and to maintain discipline (Carlone, 2003, p.32). The question-asking practices sustain the meaning of science as an established body of facts (Letts, 2001, p.262). Further, the unidirectional teacher-led talk where the teacher repeats information as the authority and the enforcement of rule-following promote 'dutiful' learners (Carlone, 2003, p.32).

Harding (1995, p.4) argues that in the context that neither gender nor science is absolute or given, both are increasingly acknowledged to be social constructs that are heavily dependent on cultural contexts, power relationships, value systems and human emotional needs. Keller (cited in Harding, 1995, p.10) has identified four distinct senses in which science is masculine. One sense relates to the predominance of males who chose to study and work within it and another is that science is structured to suit the ways in which boys learn and are connected to the world. The third sense identifies behaviours generated in the science classroom, with boys and girls acting out

appropriate gender roles, which facilitate learning for boys and restrict it for girls. The fourth sense is that science is inherently masculine, that is, its social construction in a patriarchal society has resulted in features that discourage girls from participating in it. It is this inherently masculine representation that features strongly in the school curriculum (Harding, 1995, p.14). Much of the school curriculum is presented in a depersonalised, abstracted form that attracts to it a certain type of emotionally reticent person, usually male, who has developed the need to control, to abstract and to suppress ambiguity (Harding, 1995, p.11; Letts, 2001, p.262). Not only does this exclude many girls and women, but it also constrains the development of science, permitting only certain ways of knowing, where nurturance, relational responsibility and personal orientation are poorly represented (Harding, 1995, p.17). In support of this, Kahle (1995, p.118) suggests that the actual practice of science as factual knowledge, presented by whole-class instruction and related to male activities, is an anathema to girls both at primary and secondary levels.

In summary, gender is a performative act with relational constructions of masculinities and femininities. These gender constructions are influenced by the heteronormative masculinist science taught at schools, in a way that makes both girls and boys victims. To locate this study within a theoretical framework, I will now focus on poststructural feminism and social constructionism.

2.5 POSTSTRUCTURAL FEMINISM

This study is framed by the theoretical orientation of poststructural feminism (Butler, 1990; Dillabough, 2001; Foucault, 1980; Francis, 2001; Paechter, 2001; Walkerdine, 1990). This theoretical orientation includes a wide range of positions and views that

challenge traditional thought and extends beyond promoting feminist agendas to an understanding of both masculinities and femininities. In order to understand how boys and girls construct their gendering in a science classroom, I draw on poststructuralist theories.

Poststructuralist theories problematise uniform understandings of gender (Dillabough, 2001, p.12). That which distinguishes poststructuralism from *rational* forms of structuralism is its link to deconstruction as a tool for critiquing language and its stance that gender identity is not a coherent or stable narrative (Francis, 2001; Paechter, 2001, p.43). Several terms such as 'discourse', 'deconstruction', 'subjectivity' and 'regimes of truth' have been drawn upon by feminists to examine the gendered nature of educational interactions (Dillabough, 2001, p.12). Feminist poststructuralism has allowed for an understanding of masculinity and femininity as relative rather than just analysing gender differences (Butler, 1990, p.141).

Ropers-Huilman (1997, p.327) argues that feminist poststructuralism can also aid in our understandings of gender and power discourses within our schools. Following Foucault, Dillabough (2001, p.18) argues that 'a regime of truth' about gender identity, which people understand to be historically continuous and unitary, is always present in classrooms. In this sense, femininity and masculinity are merely performed in honour of the discourses that construct them in schools. Also drawing upon poststructuralist theories are those that suggest that there is no one form of masculinity in schools, rather there are competing and contradictory forms, each of which is contingent on the conditions of gender regulation in schools (Connell, 1995; Dillabough, 2001; Gilbert & Gilbert, 1998; Mac an Ghaill, 1994).

Patti Lather (as cited in Ropers-Huilman, 1997, p.331) alerts us to the negative consequences of applying a poststructural approach in examining social contexts. Firstly, there is a danger of collapsing specific groups or concepts into a 'generalised otherness' that eventually negates the diversity and difference existing within or between those groups. Secondly, she also suggests that feminist poststructural discourse is not always readily accessible to groups existing on the margins, even though, it is often for these persons that feminist poststructuralism is intended. Gore (as cited in Ropers-Huilman, 1997, p.339) extends Lather's criticism to include a critique on the use of poststructural thought for educational analyses. Because of its constant awareness of the specificity of contextualised meaning, poststructuralism may have limited theoretical use for those who try to generalise its meaning to their particular situations. Hence, in this study I acknowledge the contextualised nature of the findings without aiming to generalise it to other contexts.

With an understanding of gender as relational, knowledge as constantly being generated and power relations as situational, a feminist research agenda has enabled me to draw on feminist poststructuralist theories to frame my research. One such theory is the social constructionist theory, which best supports and validates this study.

2.5.1   SOCIAL CONSTRUCTIONIST THEORY

Social constructionist theory sees meaning, including identities, as socially situated and constructed through social interaction (Francis & Skelton, 2005, p.28-29). This framework legitimises my interrogation of a single classroom as a bounded unit where interactions between the players are examined through the researchable relations of

power. Gender is viewed as mutually constructed through interactions (Connell, 1987, p. 184). Through observing interactions, I was able to describe the performances of girls and boys and the resultant gendered constructions. Social constructionism differs from social learning theory which is determinist with an emphasis on reproduction of roles (Francis & Skelton, 2005, pp.28-29). In contrast, social constructionism is concerned with difference and contradictions by attending to the nuances and micro aspects of local interactions (Paechter, 2001, p.41). Hence, I was able to research particular constructions of gender through examining micro relations in a particular classroom.

Social constructionists are also concerned with the ways in which different aspects of social identity; for example race, gender, social class, age and sexuality; influence interactions and individual constructions of gender (Dillabough, 2001, p.21). With regard to educational achievement, the impact of group dynamics on classroom behaviour and the relationship between such behaviours and educational outcomes have been explored. Boys and girls endeavour to construct their gender identities in ways that are deemed most appropriate or desirable to their peers and society, where these identities are invested with status and power (Francis & Skelton, 2005; Paechter, 2006b). Since social constructionist theory platforms gender as relational, the implications for construction of gender are that there can be no conceptions of masculinity without a femininity to compare and contrast it to (Connell, 1987, p.183). This research examines the construction of gendering through exemplifying the relational aspects of such constructions. While this research troubles particular relations of power in a particular classroom, I acknowledge that aspects such as school culture, teacher approach and teacher expectations, peer group dynamics, race, culture, social and economic class are part of and feed into a web of interactions. Due to the

parameters of this study, I have resolved to focus on just one aspect, that is, the construction of gendering in a grade 10 Physical Sciences classroom.

2.5.2   DEFINING 'DISCOURSE'

The use of the term 'discourse', in this study, requires clarification. David Howarth (2000) argues that "discourses are more than just conversations or dialogues but are practices that systematically form the objects of which we speak" (p.5). He adds that a discourse is a way of speaking, thinking or writing that presents particular relationships as self-evidently true. Because such 'truths' are presented as unchallengeable, this means that, within a particular discourse, only certain things can be said or thought; to challenge these assumptions is to step outside the discourse (Howarth, 2000, p.6).

Discourses can be seen as socially organised frameworks of meaning that define categories and specify what can be said and done (Paechter, 2001, p.44). Discourses are important because they can structure the way we think about things. In this way, discourses become treated as a reflection of 'reality' and hence remain unchallenged; prescribing for us what is 'normal' or 'natural' behaviour (Paechter, 2001, p.44). I use the example of the discourse of the 'good, quiet' girl instantiated in the widely held belief that girls are less boisterous than boys are. This actively constrains the ways in which girls are able to use their bodies or voice in the performance of their gender. This discourse also contains within it the view of the 'normal' girl which controls the way in which she uses her body by drawing attention to instances of deviance, such as the use of the terms 'tomboy and abnormal' (Paechter, 2001, p.45). Discourses are useful in analysing gender (Francis & Skelton, 2005, p.30). Rather than being concerned with the

'truth' or the gender gap in education, discourse analysis has enabled an interrogation of these knowledges (Francis & Skelton, 2005; Paechter, 2001).

Poststructuralist theories are most useful in understanding the asymmetrical relations of power as it allows for multidimensional perspectives of power (Foucault, 1980, p.18). In this study, I use the term 'discourse' to refer to socially organised frameworks of meaning, such as power. In this way, power relations become useful, as a convenient way to speak about the discourse of power. Hence, the discourse of power in this study is researchable as power relations, as they are performed in the grade 10 Physical Sciences classroom.

2.6   CONCLUSION

This study explores the performances learners engage in as they construct their gendering in a grade 10 Physical Sciences classroom, through examining the researchable relations of power. In this Chapter, I reviewed relevant literature and explored the theories on gender and poststructural feminism that frame this study. In the next Chapter, I discuss the research design, methodology and method that were used to collect the data.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

Following an outline of the theoretical underpinnings of this study in the previous Chapter, this Chapter provides a theoretical justification for the research design and methodology. This is achieved through a discussion of the research design, the methodology, justification for selecting the case study with interviews and observations as the methods and a discussion of issues relating to the evaluative aspects of the study.

3.1   INTRODUCTION

This study examines the performances girls and boys engage in, as they construct their gendering in a particular grade 10 Physical Sciences classroom. For the research question: *"What performances do the girls and boys engage in as they construct their gendering in the grade 10 Physical Sciences classroom?"* the construction of gendering is explored through examining the researchable relations of power. The research design situates the investigator in the empirical world (Denzin & Lincoln, 1998, p.28). The issue of design is structured by a commitment to four basic areas: (a) a connection between the design and the paradigm (b) the sample (c) the strategies of inquiry (d) the methods for data collection and analysis (Denzin & Lincoln, 1998, p.29). Through a discussion of the research design, I locate my research within a paradigm and through a discussion of the research process, I highlight 'why, when, where and how' the research was carried out.

3.2   THE RESEARCH DESIGN: BEING GUIDED BY

POSTSTRUCTURALISM AND A FEMINIST RESEARCH AGENDA

Any empirical inquiry is shaped by paradigm commitments and by the recurring questions that are asked about human experience (Cohen et al., 2000, p.137-138). Hence, the following discussion will focus on poststructuralism feminism as the paradigm as well as my own justification for the use of a qualitative methodology.

Poststructuralism is a particular strand of postmodernism where 'truth' and 'reality' depend on perspective and context (Foucault, 1980, p.18; Francis & Skelton, 2005, p.30). Poststructuralism explains the operation of power, resistance and contradiction (Foucault, 1980, p.18). I take poststructural feminism as a theoretical position for my research design.

Cohen et al. (2000, p.34-35) outline several principles of feminist research. Amongst these are the pervasive influence of gender as a category of analysis and organisation; the deconstruction of traditional commitments to truth, objectivity and neutrality; and the use of a multiplicity of research methods. Poststructural feminist research also legitimises the empowering of the oppressed and invisible groups (Cohen et al., 2000, p.35). Feminists argue that educational research is far from objective and value-free but this should be surfaced, exposed and engaged (Paechter, 2001, p.41). With a need to foreground women's agendas, feminist research is concerned with the construction and (re)production of gender (Butler, 1990, p.33). Hence, I was able to use gender to shape the methodological principles of the research. For example, I was able to use qualitative, interpretative research that had deliberate partiality where I was able identify with the

participants and they could identify with me. A feminist research agenda, located within poststructuralism, has enabled me to employ a qualitative approach to my research.

3.3   A QUALITATIVE RESEARCH METHODOLOGY

Through drawing on their own experiences as a resource, qualitative researchers seek strategies that allow them to make connections among lived experiences (Cohen et al., 2000, p.19). It is these connections that I have attempted to forge out of the empirical data from the study.

A qualitative research methodology enabled me to understand human behaviour through observing and interacting with people in order to construct the social world as they construct it (Merriam, 2002, p.3-6). This methodology was most appropriate for my research as it enabled me to observe gendered relations within the natural context of the classroom. Important for me, is the assertion that in qualitative research, the questions are often broadly outlined to allow the data to generate questions and challenge the assumptions on which the original idea was built (Cohen et al., 2000, p.138). Hence, I was able to re-visit my original research questions and re-group them for relevance and appropriateness.

Working within a qualitative approach, I was able to capture and interpret meanings as they arose out of a particular social situation. This enabled the data to be contextualised and interpreted as socially situated and context-related. Realities could be viewed as multiple and constructed where meanings and understandings could be sought rather than proof. In other words, qualitative research allows for an understanding of human behaviour rather than explaining and predicting it (Neuman, 2000, p.18). Hence, guided

by a qualitative approach, this research was concerned with description rather than prediction, induction rather than deduction, and construction rather than enumeration. Qualitative research enabled a study of power relations as a human phenomenon, by describing and understanding behaviour in the natural setting of a classroom (Cresswell, 1994, p.27; Mouton, 1996, p.18). In qualitative research, the researcher is often part of the researched world (Merriam, 2002, p.6). However, being an Indian female adult it became difficult to become one with the participants and blend in. I was aware that my position as both a researcher and outsider could contribute to unequal power relations between the participants and myself. Hence, I focused on establishing trust as well as maintaining informality and friendliness during my contact with the participants.

3.4 A FOCUS ON THE PARTICIPANTS

Judgements had to be made about the selection of the site, the sample size, the representativeness of the sample and access to the sample. What follows, is a justification for the choices made regarding the participants of the study.

3.4.1 THE SAMPLE

While this research troubles particular relations of power in a particular classroom, I acknowledge that aspects such as school culture, teacher approach and expectations, peer group dynamics, race, culture, social and economic class are part of and feed into a web of interactions (Paechter, 1998, p.2). Due to the parameters of this study, I have resolved to focus on just one aspect, that is, the gendered performances and the resultant construction of gendering in a grade 10 Physical Sciences classroom.

In this small-scale research, a particular group was targeted with acknowledgment that it did not represent the wider population. This non-probability sampling was adequate since it did not require generalisation beyond the sample in question (Neuman, 2000, p.17). In addition, as convenience sampling, the sample did not represent any group apart from itself. The selection of an African township school, *New Dawn Secondary*, from the Umlazi Township was both deliberate and convenient.

The selection was deliberate in that the school targeted for this study is part of the National Department of Education's Dinaledi initiative. This national initiative is a program crafted to support the teaching and learning of Mathematics and Physical Sciences with the aim to develop these schools to become centres of excellence for the teaching of Mathematics and Physical Sciences. Driven by the National Strategy for Mathematics, Science and Technology (Department of Education, 2005, p.3), this initiative aims to increase the participation and performance of African, especially, girl learners, in Mathematics and Physical Sciences. Further, the selection of a grade 10 Physical Sciences classroom where the National Curriculum Statement is being implemented was also deliberate. Here, the curriculum emphasises learner centeredness and sensitivity to issues of gender amongst its focus areas (Department of Education, 2002, pp. 5-8). The selection enabled me to study its implications for gender constructions.

I make use of the categories 'girls' and 'boys' to describe the young adults because these were the categories that they used to describe themselves. I selected a grade 10 class because, I believe, that here the learners are at a stage of puberty where they are starting to find their identity, are linguistically competent and articulate, and are not

pressurised by exit examinations. The sample consisted of twenty-two girls with their ages ranging from fifteen to sixteen years and nineteen boys with their ages ranging from fifteen to eighteen years. The selection of the teacher was not deliberate because I believe that either sex could foreground interesting dynamics in terms of gendered discourses. In any event, the intention of the research was to draw attention to the performances girls and boys engaged as they constructed their gendering and to elevate this as is justified by a feminist research agenda. At *New Dawn Secondary*, eight one-hour grade 10 Physical Sciences lessons were observed over the two-week period. The teacher, *Mr P. Malinga* (pseudonym) conducted the lessons on *Waves* in a classroom that was set up in the traditional style with rows of desks facing the teacher.

My selection of the boys and girls for the interviews was deliberate. The selection of the girls included those that were active participants in the class as well as those who were not. The selection of the boys was from a group that were noisy and disruptive during the lessons and one boy from outside this group who was not disruptive. This deliberate sampling ensured that the interviews captured the views and experiences of a range of learners. I chose not to interview the teacher because of the constraints of the parameters of this study and my early interactions with him. The period for the collection of the data was not long enough to include interviews with the teacher. In addition, in my early interactions with the teacher I concluded that he was very aware of gender issues and I felt that he might respond in a manner 'appropriate' for the intention of this study, as he had preconceived ideas of the results this study. For example, in my interactions with him, he stated that girls should be given special attention in science lessons, as this is the government's position. I chose rather to focus on observing him

in the classroom. Given these reasons and that, the focus of the study foregrounds the relations and experiences of the learners; I chose not to interview him.

The selection of the school was convenient because it was easily accessible and relatively close to my area of residence. Access to the school was also not an issue since I had established a good working relationship with the Principal. In addition, I had previously visited the school as part of a monitoring exercise by the Department of Education and was familiar with its location. Finally, important for my research was the fact that the school was 'stable' in terms of management. This 'stability' is reference to the same management team that was in place during the course of my study. The implication for my research was that the management of the school did not vary considerably, thus affecting my access to the learners.

3.4.2   GAINING ACCESS AND OBTAINING CONSENT

Gaining access and informed consent was a starting point for my interactions in the field. Permission to do research at the selected school was firstly sought from the KwaZulu-Natal Department of Education (Appendix 1.1). A letter was then sent to the Principal and Governing Body of the school requesting permission to conduct research at the school (Appendix 1.2). In the letter to the school, the details of the study, such as the rationale, were explained and the method to be used was outlined in an unambiguous manner. The benefits of the study, that is, how it may lead to a better understanding of the complex interactions between girls and boys and how this can influence their learning in class, was explained. Commitments to minimum disruptions to the lessons were also made. In obtaining consent from the parents, it was also mentioned that learners' participation was voluntary and that they were not compelled

to participate or they may withdraw from the research at any time (Appendix 1.3). Ethical issues concerning confidentiality were also discussed in the letters to the School and the parents.

3.4.3   ETHICAL DILEMMAS: ISSUES OF PRIVACY AND CONFIDENTIALITY

Permission from the learners to participate in the research was obtained from them. The purpose of the study as well as the data that was to be collected and how they would be affected was outlined to the learners. Learners were assured of minimum interruptions and disturbances to their lessons. The issue of anonymity and the strict adherence to confidentiality was explained in detail to the learners, that is, the name of the school and their names would not be used in the research reporting through a deletion of identifiers. They were informed that the results of the research would not be used for any other purpose, without their consent. This was important since it was the first step in gaining the trust of the learners. I also sought permission to use an audiotape during the interviews and to take notes during the lessons. Learners were reminded at the start of every interview of anonymity and their right to refuse to answer questions. Finally, the data was securely stored and the coding which was kept separately, would be ultimately destroyed.

3.5   THE RESEARCH METHOD

A case study method was most appropriate to my research because it enabled an understanding and interpretation of the participants' world (Cohen et al., 2000, p.182). I resolved to use observations and interviews for my study because it was most apt within the research paradigm and methodology.

3.5.1   A CASE STUDY OF THE PHYSICAL SCIENCES CLASSROOM

A case study is the study of "an instance in action" in a bounded system, such as a classroom (Cohen et al., 2000, p.181). Gillham (2000) defines "a case study as the study of a unit of human activity where the researcher works inductively from what is found in the research setting" (p.7). A bounded system such as the Physical Sciences classroom enabled the study of the construction of gender within the space of that particular classroom. Paechter (1998, p.22) found that examining the use of and the dynamics of classroom space can generate important clues on the gendered relations between those inhabiting the spaces.

Qualitative studies involve cases or instances of phenomena and social processes (Denzin & Lincoln, 1998, p.5). A single case or a single process is called an intrinsic case study (Stake, 1998, p.107). In this research, a case study refers to the process of learning about a case, a grade 10 Physical Sciences classroom. A case study method of inquiry enabled me to produce a rich and vivid description of events in the classroom. In doing this, I had to guard against merely producing an illustrative account, highlighting sensational aspects or selective reporting at the expense of the full picture (Gillham, 2000, p.19). A key issue became the selection of information for reporting. While I recorded typical, representative occurrences, I found it equally important to report on infrequent, unrepresentative critical incidents. For the case study, observations and interviews were the method of data collection with the observation schedule and the interview schedules being the instruments.

3.5.2   THE RESEARCH METHODS AND INSTRUMENTS

The research methods and instruments used were the observation method with an observation schedule and interviews with unstructured interview schedules.

3.5.2.1   THE OBSERVATION METHOD AND THE OBSERVATION SCHEDULE

For the research question: *"What performances do the girls and boys engage in as they construct their gendering in the grade 10 Physical Sciences classroom?"* the method for data generation was firstly through observations using a semi-structured observation schedule (Appendix 2.1) as well as a narrative schedule that guided my note-taking (Appendix 2.2). The questions for the observation schedule were refined after a piloting of the initial questions. The piloting of my initial observation schedule with the participants confirmed that what may be appropriate was an open-ended observation schedule enabling the participants to determine the agenda and generate the data. During the pilot, I made field notes and then located the knowledge in categories that were built up inductively from the observations. The questions were selected because of their relevance to the research question. The Grade 10 Physical Sciences lessons were observed everyday for two weeks, followed by interviews. The observations included a wide range of interactions with the participants, including participating in their work and in their conversations with each other. This enabled me to 'become' the instrument of observation and seeing firsthand how the participants acted (Henning, 2004, p.19). What I observed (saw and heard) was in effect my version, as a researcher, of what was "there", guided by the purpose of the research and my research question. Note-taking of critical events during the observation enriched the data generated by the observation schedule.

3.5.2.2   INTERVIEW METHOD AND THE INTERVIEW SCHEDULE

For research question: *"What performances do the girls and boys engage in as they construct their gendering in the grade 10 Physical Sciences classroom?"* a selection of four girls were interviewed individually (Appendix 2.3); a focus group of girls only were interviewed (Appendix 2.4) and a focus group consisting of both boys and girls were interviewed (Appendix 2.5). The data generated from the observation schedule helped reshape and refine the questions of the semi-structured interview schedules. While the semi-structured interview lent itself to an open-ended interview, as a novice researcher I was guided by a set of interview questions. The time spent observing the class was also used to establish my credibility and earn the trust of the learners. In preparation and rehearsing for the interview, I paid particular attention to the framing of questions, the use of prompts and probes and the flow of the interview. As an introduction to the interviews, I reminded the participants of the purpose of the study, the issue of voluntary withdrawal as well as how their anonymity and confidentiality would be ensured. While acknowledging that the focus group interview was challenging to me as a novice researcher, I aimed to direct rather than control the interview, taking note of differences in participation and non-verbal communication while probing responses and redirecting answers for comments from other participants. The interviews were audio taped and extensive notes taken, with the permission of the participants.

3.6   VALIDITY AND RELIABILITY

Qualitative research strives to render accountable methods and procedures of data gathering and interpretation (Cohen et al., 2000, p.105). Here, the researcher's frame of

reference largely determines the implications of the concept of "objectivity" (Niemann, 2000, p.283).

3.6.1 ENSURING VALIDITY

Validity is more than just an instrument measuring what it is supposed to measure. It is also about honesty, depth, richness and scope of the data, as well the extent of triangulation (Cohen et al., 2000, p.106).

3.6.1.1 INTERNAL VALIDITY

Internal validity seeks to demonstrate that the explanation of a particular event or issue can be sustained by the data (Cohen et al., 2000, p.107). This was achieved through ensuring confidence, credibility and dependability of the data. Confidence and credibility in the data was achieved through persistent observations of the lessons over two weeks, as well as different groups of interviews of the same participants, that is the individual girls' interviews were followed by an interview with the same girls but within a group. This was followed by an interview with the same girls together with boys in a mixed group interview. Themes emerging from the different interviews were triangulated with each other as well as with the themes that emerged from the observations. In addition, to increase internal validity, I used the computer to record, store and retrieve the data.

3.6.1.2 EXTERNAL VALIDITY

External validity refers to the extent to which the results can be generalised to the wider population (Niemann, 2000, p.285). In naturalistic research, generalisation refers to comparability and transferability (Cohen et al., 2000, p.109). Since it is possible to

assess the typicality of the participants and settings, I provide clear and detailed descriptions so that readers could decide on the possibility of generalisation and transferability. However, this study is contextual and does not seek generalisation.

3.6.1.3   CONTENT VALIDITY

To achieve content validity, the instrument must show that it fairly and comprehensively covers the domain it purports to cover (Cohen et al., 2000, p.109). The observation schedule was piloted and the items were changed for appropriateness so that only questions that addressed the research question were included. The piloting also informed the use of an open-ended observation schedule as well as the questions of the open-ended interview schedule.

3.6.2   ENSURING RELIABILITY

Reliability is about consistency and replicability, that is, precision and accuracy (Cohen et al., 2000, p.117). In qualitative research, reliability includes authenticity, comprehensiveness and detail (Cohen et al., 2000, p.117). Respondent validation was ensured through taking back the research to the respondents to check for accuracy. The use of audiotapes also contributed to internal reliability by an accurate recording of the interviews. External reliability involves a verification of the findings of the research (Niemann, 2000, p.284). To increase reliability, an exposition of the theoretical underpinnings for the various choices made with regard to the design and methodology is provided (see paragraph 3.3). Internal reliability also refers to attending to reliability during the research project, for example, the triangulation of methods (Niemann, 2000, p.284). I used both interviews as well as observations to enable a triangulation of methods.

3.6.3   INTERVIEWS: VALIDITY AND RELIABILITY

Validity and reliability were addressed by minimising my own bias as the interviewer. Having read extensively on gender issues, I had certain preconceived ideas about the unequal relations between learners. Hence, I guarded against any tendency to seek answers that supported my preconceived notions about gender. To minimise misunderstandings on the part of the respondent, I frequently repeated questions and often re-phrased them. This was important because the learners were all first language IsiZulu speakers. Reliability was ensured through piloting the interview schedules and thereafter coding the responses consistently. The open-endedness of the interviews allowed the participants to shape the interview while I was careful not to ask leading questions. Before the interviews, I had informal discussions with the interviewees about school life to establish a rapport with them.

Henning (2004,) argues that "interviews conducted in the dominant male paradigm of pitching questions that demand answers from a passive respondent are one of the dilemmas in feminist research" (p.89). I made efforts to establish trust because young adults were being interviewed. I also maintained informality, worded the questions carefully and pitched the questions at the appropriate level. This also required me as the interviewer to be clear, structured, friendly and gentle. Through interpreting answers instantaneously, I was able to confirm my interpretations with the learners during the interview. From a feminist research agenda, an interview is not just a data collection situation but a social situation with the power often residing with the interviewer (Cohen et al., 2000, p.120). This was important since I acknowledge that interviewees have the power to withhold information and even decide what knowledge is important.

Reliability in interviews extend beyond the preparations for and conduct of the interviews; but extend to the ways in which the interviews are analysed (Cohen et al., 2000, p.120; Merriam, 2002, p.121). I was cautious about the interview transcripts being accurate and detailed; and the coding done correctly.

3.6.4   OBSERVATIONS: VALIDITY AND RELIABILITY

To address reliability of the observations, I ensured that the data were entered into appropriate categories consistently and accurately. Regarding external validity, this research did not seek transferability and replicability because it focused on providing an account of a particular context rather than seeking typicality. A pilot of the observation schedule ensured that the categories were appropriate, exhaustive, discrete and unambiguous with the research question being the central focus. By spending time with the learners and interacting with them, I aimed to decrease changes in behaviour because of my presence, while I acknowledge that this may not have been entirely minimised. This served as an internal validity check. To address this, I completed a triangulation of the data from the observations with those from the interviews.

3.6.5   TRIANGULATION

Triangulation is a powerful way of demonstrating concurrent validity (Cohen et al., 2000, p.112). However, critics of triangulation maintain that the very nature of triangulation is positivistic (Cohen et al., 2000, p.112). This is most exposed in data triangulation where it is presumed that multiple sources of data are superior to a single data source (Niemann, 2000, p.285). In addition, the assumption that a single unit can always be measured more than once violates the interactionist principles of emergence, fluidity, uniqueness and specificity (Cohen et al., 2000, p.114).

Working within a poststructural feminist paradigm, this study focused on the context and uniqueness of the site. However, as a novice researcher, I did to some extent; attend to issues of validity, reliability and triangulation. To ensure validity appropriate instrumentation and sampling techniques were used. To minimise invalidity correct coding, correct aggregation of data and fair emphasis of data was ensured. Correct coding and aggregation of data were ensured through repeating the exercise for accuracy and relevance. In addition, triangulation was achieved by using contrasting methods, that is, observations and interviews. The outcomes and emerging themes from both these methods were similar and this resulted in confidence in the methods used and the data collected.

3.7   CONCLUSION

This Chapter provided a theoretical justification for the research design and methodology. 'Fitness for purpose' was the guiding principle when I made informed choices for the research design, methodology and method for this research. The data collected will be analysed and discussed in the next Chapter.

CHAPTER 4

DATA PRESENTATION AND ANALYSIS

In this Chapter, I discuss key findings from the data, the collection of which were explained in the previous Chapter. The data will be analysed within the theoretical framework and literature review discussed in Chapter Two. Following the presentation and analysis of the key findings, I provide a synthesis and some concluding insights into the findings.

4.1   INTRODUCTION

This study sought to examine the power discourses in a grade 10 Physical Sciences classroom and how it related to the construction of the boys' and girls' gendering. To gain insight into how the performances of the boys and girls led to their construction of gendering, I resolved to use the following research question:

> *"What performances do the girls and boys engage in as they construct their gendering in the grade 10 Physical Sciences classroom?"*

This study focused specifically on *which* performances within *which* classroom contexts influence the construction of gendering through examining the researchable discourses of power.

4.2 THE DATA COLLECTED

The previous chapter provided an in-depth description of the methodology used for the data collection, as well as how the data was collected.

The data collected from the observations and the interviews were grouped together in categories that reflected emerging themes. The themes that emerged from the data were collapsed into three overarching themes because their relatedness to each other enabled easier explanations.

The three overarching themes with regard to the performance of gender were:

- Classroom space and the performance of gender

- Learner interactions and 'doing gender'

- Physical Sciences as a discourse of power

What follows is a presentation and analysis of the data within these themes.

4.2.1 CLASSROOM SPACE AND THE PERFORMANCE OF GENDER

An analysis of the observation schedules and the field notes indicated that the use of the classroom space and the interactions within this space were rich in information about the construction of masculinities and femininities.

All the lessons observed on the Section *Waves* were conducted in the classroom. During the period of my observation, the science laboratory was currently being built and no facilities existed for conducting science investigations. While the lessons were

conducted in the classroom, the teacher did not make use of any resources to demonstrate phenomena, such as slinky spring or water trough to show different wave formations. Hence, all the lessons were theoretical with occasional diagrams of waves being drawn on the chalkboard.

In the untidy, congested classroom, 41 learners occupied desks that were cramped into the classroom space, leaving a small section at the front of the classroom that was used by the teacher. Each lesson began with a greeting by the teacher followed by the lesson where the teacher spoke and intermittently asked questions. Periodically, reference was made to the appropriate page in the textbook, to which learners referred. The eighth lesson was followed by a short test, which was written by the learners.

The learners sat extremely close to each other in the overcrowded classroom. There was a clear distinction between the teacher space and the learner space. The teacher occupied the space at the front of the classroom and did not enter the space of the learners. Space was used in a way that kept the teacher separate and at a distance from the learners. It was observed that both the teacher and the learners stayed in 'their' space throughout the lessons. While the girls occupied the front of the classroom and the boys were seated at the back, a few boys sat next to girls. This pattern was repeated in all the lessons observed. In the interviews, the girls indicated that they chose to sit at the front of the classroom out of the reach of the boys.

While the learners were seated all the time, they found other ways of interacting with each other in the presence of the teacher. They spoke to each other in hushed tones concealing their faces and hence it was not obvious who was speaking. While the girls

appeared to be were attentive, most of the boys were disinterested in the lesson. Some of them slouched over the desk and others even hid their faces from the teacher, escaping his gaze. As the lessons progressed, some of the boys' voices became louder while the teacher continued with his teaching, appearing oblivious. The girls, who were attentive most of the time, occasionally joined in the conversation with the boys but did so mostly to quieten them. On two separate occasions, I observed some of the boys touching and hugging the girls when the teacher turned to write on the chalkboard. These girls did not protest but some tried to wrench themselves away.

Conspicuously, the girls occupied the front of the classroom in constant gaze of both the boys and the teacher. From here, they engaged in the lessons out of the physical reach of the boys. The verbal taunts from the boys continued throughout most of the lessons. Some of the boys often called out for the girls in hushed tones and laughed out aloud each time the girls responded to the teacher. The teacher engaged with the girls at the front of the classroom who showed interest in his lessons and seemed oblivious to the boys' disruptions from the back of the classroom. While some girls tried to be attentive and participate in the lessons, other girls sat quietly, just listening. In addition, a few boys sat quietly. It was the older dominant group of boys, who openly scoffed at the girls' attentiveness by laughing and teasing.

Throughout the lessons, the girls were mostly quiet and obedient, as they appeared to listen to the teacher. A few of the girls answered questions directed by the teacher while most of the girls listened attentively. As the lessons progressed, the learners seemed to become oblivious to my presence, talking while the teacher was teaching. In one of the lessons, two of the boys at the back continuously kicked the chairs of the girls in front

of them, while talking to them. In another lesson, two of the boys occupied chairs next to two other girls. Some of the boys leaned on the girls and periodically spoke to them. Repeatedly, one of the girls had to push away a boy's hand as he leaned close to her, touching her back. This behaviour was mostly by the 'older-looking' boys. Not all the boys were disinterested and un-attentive during the lessons. Some of the boys who appeared 'younger' were mostly quiet, listening attentively to the teacher.

In the interviews with the learners, both the boys and the girls were clear about why they preferred specific areas of the classroom. Thandi, in the individual girls' interview stated her reason for sitting at the front of the classroom:

> Thandi: *"I sit in the front of the classroom to concentrate.*
>
> *Boys at back make too much noise..."*

In the girls' group interview, Thembi felt very strongly about the demarcation of classroom space:

> Thembi: *"Boys go to back and chase girls to front... they own back."*

while Pretty reiterated what was said by Thandi in her individual interview:

> Pretty: *"...boys at back rude so teacher won't see. Better for girls to be at*
>
> *front. They touch girls at back..."*

In the interviews, the girls agreed that it was better to sit at the front of the classroom where they could concentrate and not be disturbed by the boys. In the girls' group interview, all the girls agreed with Pretty's statement that the boys touch the girls at the back. In the boys and girls mixed group interview, the girls held on to their belief that

girls were better off at the front of the classroom, while the boys all agreed with Chris when he asserted that girls only sit at the front of the classroom to impress the teacher. Sizwe went further to remark on why he thought girls should sit at front of the classroom:

> Chris: *"...they like to sit in front to show the teacher they are clever…like they know what is happening."*

> Sizwe: *"Ja* (yes)*, then they must sit in front and answer the questions."*

When questioned about the demarcation of space between the teacher and learners, both the boys and girls agreed that the teacher needed to be in front of the class:

> Sizwe: *"...to write and explain and show things. Learners can watch him better."*

Precious, in the mixed boys and girls group interview added that they could get into trouble if they walked around in the classroom. However, when discussing the use of classroom space, it was Pretty in her individual interview that went further to suggest how best she thought girls ought to learn:

> Pretty: *"Girls should sit in groups together to help each other … can concentrate … when sit with boys they laugh and talk about our bodies."*

From my observations and the interviews conducted, I conclude that the use of the classroom space led to the policing of the girls. Hence, the classroom became a discursive space in which the boys and girls engaged in relations of power.

4.2.2 LEARNER INTERACTIONS AND 'DOING GENDER'

Interactions between learners centred mostly on the girls' participation and performance in Physical Sciences as well as the sexual overtures from the boys. In the lessons

observed, the attentive girls followed instructions from the teacher while most of the boys engaged in their own conversations and merely chorused responses with the teacher. Conspicuously, in all the lessons observed, the girls' participation in the lessons was the basis for teasing and mocking by some of the boys. A few of the boys quietly cooperated with the teacher but did not make any inputs into the lesson. In one of the lessons observed, a boy pulled a worksheet from a girl and copied her work. The girl, in response, uttered her unhappiness in a hushed tone. In another incident, a boy demanded an answer from a girl who was sitting in front of him, by prodding her from behind. The girl, in irritation, responded with the answer.

The observations about the specific practices of the boys and girls were reinforced by the learners' responses in the interviews conducted. While all the girls strove to be 'good' science students, dutiful and obedient, most of the boys were noisy and disruptive. In the mixed group interview of both the boys and girls, the boys offered reasons for their disruptive behaviour as well as why they thought the girls participated in class:

> Sizwe: *"They wanna show the teacher they know everything. Clever girls show off ...boys laugh at the clever girls."*

In the individual girls' interviews, Precious and Pretty expanded on the disruptive behaviour of the boys:

> Precious: *"Boys talk and make noise at back when teacher is teaching. They don't care about the teacher, they just fool around."*

The boys used their voice to dominate in the lessons. They were loud and bullied the girls into submission.

> Pretty: *"They bully you and say do this, talk rough. Then they laugh at you together. If you don't give them your work they catch you lunch time and tell you rude things and push you around..."*

The classroom interactions between the boys and girls were also influenced by which girls were perceived as 'clever'. Pretty, who was referred to by both the boys and girls as 'clever', in her individual interview reported on the constant teasing she is subjected to by the boys. She regarded herself as intelligent and had to work hard at home:

> Pretty: *"Boys tease me all the time and sometimes girls too because they say I think I know too much. They know I am intelligent and I have to study at home from the text book."*

Sizwe afforded an explanation for wanting to sit next to 'clever girls':

> Sizwe: *"We only sit next to clever girls if they help us..."*

Precious explained how boys and girls outside their class related to girls studying Physical Sciences. Other girls respected them but other older boys still viewed them as objects they can dominate despite their 'cleverness':

> Precious: *"Other girls say you are clever. Other boys say you think you are clever but we can take you ... they are bigger boys..."*

Sizwe explained why the boys laugh at the 'clever girls':

> Sizwe: *"Boys laugh at these girls because they want all the attention. They put*

their hands up all the time and say answers even when it is wrong."

Pretty in the girls' only focus group shared similar views:

Pretty: *"...boys mock and tease us - they say you always raise your hand … you*

think you better than us..."

Pretty alluded to this in her individual interview:

Pretty: *"They bully you and say do this, talk rough. Makes girls feel nervous. If*

boy does something wrong, girl scared to ask him. He will just laugh at

you. They make fun of you together."

Thembi's response about the interactions between boys and girls was similar:

Thembi: *"Boys make fun of us when they see we are clever and make us scared."*

The interviews also revealed that the interactions between the boys and girls were often centered around sexuality:

Precious: *"Boys talk about girls, which one is pretty or ugly. In the science class*

they say you think you are so clever but your dress is so short and I

like to sit next to you. I just keep quiet."

While Thandi referred to the boys as disrespectful because they say that they want to kiss the girls, Pretty felt that the boys respected her and this made her feel powerful:

Pretty: *"I hate boys – they lead us to do bad things. They scared of me, respect*

me … because they know I'm clever..."

When probed further about why boys treated her differently she responded:

> Pretty: *"Boys worry other girls more because when girls clever they worry for answers ...if they see you are not clever they want to touch you – sit near you and say they like you..."*

After class, the boys are more forceful in their interactions with the girls:

> Pretty: *"Boys always insulting girls and ask money of the girls. Boys want to impress other girls, hugging and kissing, even hugging in science class."*

The boys felt that the girls did not reject their advances and that there was nothing wrong with their advances:

> Mdu: *" ...they don't tell us if they don't like it – they just laugh and enjoy. We call the girls we sit next to: sexy eyes."*

4.2.3 PHYSICAL SCIENCES AS A DISCOURSE OF POWER

I observed that the teacher maintained his authority through his teaching style. The teacher's tone of voice was formal, dominant and authoritative as he merely recited facts to the learners about the properties and the types of waves. He focused on the girls and seemed oblivious to the disruptive behaviour of most of the boys. Most of the girls were attentive and participated in the lessons while others sat quietly. The teacher seldom spoke directly to the learners, except for when he asked the learners questions. While frequently using gestures, he equally singled out girls and boys to ask questions. While seldom making eye contact with the learners, the teacher did not use praise nor did he refer to the learners by their name. The teacher did not use questions to establish prior knowledge or probe understanding but to get learners to repeat facts in a chorus.

Learners did not in turn direct any questions to the teacher but merely listened to the teacher. The teacher-centred lessons were abstract and theoretical with no links or relevance to the learners' lives. Even in the absence of a science laboratory, no practical work or demonstrations were done in the classroom and this contributed to the abstract nature of the lessons. Diagrams to illustrate the concepts were drawn on the chalkboard. The lack of demonstrations contributed to the abstract lessons. The teacher did not use examples familiar to learners to illustrate concepts such as types and examples of *Waves*. The teacher made no specific distinction between the genders throughout his lessons but engaged with them in general. The data gathered from the observation schedules were reinforced by the field notes taken.

The learners' discussion of Physical Sciences focused on issues of achievement. Successful girls were viewed as 'clever' by both the boys and girls. Mdu's response illustrated what the boys thought of the girls' dutifulness in class, in particular the 'clever girls':

> Mdu: *"Girls clever, more popular. Boys feel she is making herself more better than everyone else. Boys don't like that; Boys tease that girl because she is making herself better than everyone. Boys ask clever girls for help but don't sit next to them but they call her names like 'Mama Jack.'*

The girls voiced their dislike to being labelled by this name, which is a film character of a man dressed as a woman. The character is portrayed as a masculine female who is not desired by the males. In the classroom, the boys have labelled the 'clever' girls as masculine finding them unattractive.

Both the boys and the girls stated that they respected the authority of the Physical Sciences teacher because the subject was difficult but the boys were disruptive and were disinterested in the lessons. They also respected the knowledge of the Physical Sciences teacher and did not question him.

    Pretty: *"Boys just say "yes sir, yes sir" all the time but they don't*

              mean it... they don't care... not all boys are like this."

    Pretty: *"...at least they are not so bad in the Physical Sciences classroom*

              as they are in the IsiZulu classroom."

When asked why this was the case, Pretty replied:

    Pretty: *"...they know Physics is hard and they have to listen to the teacher."*

Both the boys and girls experienced the learning of Physical Sciences to be difficult and inaccessible. They stated that they did not find any relevance to their lives nor did they understand why they studied certain concepts. Nevertheless, both the boys and girls persisted because they felt that the subject was prestigious and studying Physical Sciences would give them an opportunity to prestigious careers. However, the girls were attentive and participated in the lessons while the boys were disruptive. The girls stated that they preferred to learn Physical Sciences without the boys, in groups, because of their disruptions and disinterest. Repeatedly, the girls had to be subjected to the ignominy of their attempts to achieve in Physical Sciences.

Having discussed the three main themes emerging from the data, the next section presents a synthesis of the data and the theoretical understandings.

4.3 SYNTHESIS AND INSIGHTS: GENDERED PERFORMANCES IN THE PHYSICAL SCIENCES CLASSROOM: THE CONSTRUCTION OF MASCULINITIES AND FEMININITIES

Following poststructuralist understandings, the construction of masculinities and femininities are seen as performative acts (Foucault, 1980). In this study, the constructions of gender were found to be relational performances within the prevalent discourses of power. I now discuss some of the performances that were evident from the data, in the sections that follow.

4.3.1 'MACHISMO MASCULINITY' AND 'COMPLIANT/RESISTANT FEMININITY'

Following Foucault (1980, p.18) on the discourse of power, power can be productive, where it can construct subjectivities. The body is located as an increasingly significant site for the operation of multiple powers. Individuals can simultaneously undergo and exercise power and be positioned in different ways at different times depending on the discursive environment (Connell, 1987, 1995; Francis, 2001). In this study, the data suggests that the boys and girls were constantly engaged in the production of power through compliance and resistance. What emerges from the data is that specific masculinities and femininities were constructed in relation to each other. These constructions will be discussed below, with an elaboration of how it was performed within dominant discourses in the sections that follow.

The literature suggests that gender is the performative accomplishments of particular articulations of space and time (Butler, 1990, p.34). The girls and boys in this study used their bodies to occupy space in time to perform a traditional masculinity and

femininity. Within the space and time of the classroom studied; and the interactions between the learners and the science taught; the hegemonic masculinity that emerged was that of a '*macho*, heterosexual' male. I term this masculinity, '*Machismo Masculinity*'. The *'Machismo Masculinity'* was persistent, authoritative, aggressive and sexually assertive. As the embodiment of the macho male, the majority of the boys who constructed this type of masculinity were portrayed as strong, sexually aggressive, domineering males who determined the agenda for the girls. The sub-ordinate form of masculinity was that of quiet compliance where some of the boys cooperated and offered no resistance.

I term the emphasised form of femininity as that of '*Compliant/Resistant Femininity'*. The reproduction of this form of femininity was performed as a complex mixture of compliance, cooperation and submission; as well as resistance, non-compliance and opposition. This form of femininity was constructed in relation to the performance of the pervasive hegemonic masculinity. Power was constantly negotiated between the learners. Those that were powerless in one instance became powerful in another. This was evident when some of the girls used their agency to move from a seemingly powerless position to a position of power rather than become passive victims.

The construction of hegemonic masculinity and the emphasised femininity will now be discussed in the context of the performance of gender and use of classroom space, learner interactions as well as Physical Sciences as a discourse of power.

4.3.2   BODIES IN SPACE: THE PERFORMANCE OF 'MACHISMO

MASCULINITY' AND 'COMPLIANT/RESISTANT FEMININITY'

One of the most highly gendered aspects of schooling is the control of learners' use of physical space (Skelton, 2001, p.27). Here, bodies in space were used as physical capital in the exercise of power, which influenced gender constructions. This is supported by the literature, which suggests that the body is a significant site for the operation of power (Paechter, 1998, p.23; Walkerdine, 1990, p.7).

From the data, the performance of *'Machismo Masculinity'* was marked by the boys' control of the use of space by the girls. They used the classroom space to dominate and exercise their power and control over the girls through their misogyny and sexual intimations. By taking over the back of the classroom as their territory, they had demarcated an area in which they excluded the girls as they performed their masculinity. In this way the girls' occupation of space were policed by most of the boys. The girls stated that any transgressions into the space of the boys would result in unwelcome physical and sexual overtures from these boys. The data suggests that *'Machismo Masculinity'* was manifest with sexually explicit intimations from these boys, such as their verbal misogynist taunts. The 'macho' boys used gendered violence to control space the use of space of girls as they performed their masculinity. Hence, this hegemonic masculinity existed because it operated in opposition to the femininity. Connell (1995, p.18) states that hegemonic masculinities derive their power from operating in opposition to femininities. However, some boys sat quietly and did not engage in the misogyny. In the construction of this sub-ordinate masculinity, they engaged in performances of compliance and cooperation. These boys did not contribute to the lessons nor did they join the boys in their macho performance. In this way, their

quiet compliance was a way of resistance to the aggressive, heterosexual and dominant masculinity. The dominant boys excluded them from their performances and did not target them in their misogyny.

The girls positioned themselves in relation to the hegemonic masculinity as they performed their '*Compliant/Resistant Femininity'*. Here, for the girls, the performance of their femininity was marked with compliance but their relative powerlessness became a source of pride and power when they engaged with the lessons. The data suggests that most of the boys dictated the girls' use of space. The girls complied with the boys' dominance and control by occupying the front of the classroom. In this way, it was the bodies of the boys that generated their spaces and that of the girls. The girls occupied the front of the classroom and complied with the authority of the teacher by being dutiful. In this way, the bodies of the girls became constituted and confined by the space. This is supported by the literature that suggests that bodies can generate spaces and can also be constituted by their spatiality (Nespor, 2000, p.29). When their embodiment was controlled and the ability to exercise their agency was circumscribed and controlled by the boys, the girls used their agency to become dutiful learners. Most of the girls were attentive and participated in the lessons while others sat quietly. Although, most of the boys controlled the girls' use of space, the girls used the front of the classroom to participate in the lessons. Hence, a situation, which rendered the girls powerless, became their source of agency, affording them power. This is supported by the literature which states that power is fluid and relational (Foucault, 1980, p.18). The construction of the '*Compliant/Resistant Femininity'* was in opposition to the hegemonic masculinity, which determined the agenda.

Through his authority, the teacher colluded in the construction of the exalted form of masculinity. The teacher occupied the front of the classroom and interacted with mostly the girls while appearing to be oblivious to the disruptions from the boys. The data suggests that this was interpreted by the boys as acceptance of their behaviour while the girls were encouraged to be dutiful learners. Both the boys and the girls stated that the teacher had to occupy the front of the classroom to enable him to teach. This is an indication that the teacher's authority was reinforced by the manner in which he used space. The teacher's control of the learners' movement was also a means of asserting his authority. Even though most of the boys engaged in a masculinity that was macho and aggressive and the girls performed a femininity that was sometimes resistant, both boys and girls complied with the authority of the teacher. They obeyed the teacher by not walking around in the classroom and chorused statements made by the teacher without challenging him. This is supported by the literature that suggests that the hegemonic masculinity is dependent on the context and access to power (Bhana, 2002).

In summary, in the grade 10 Physical Sciences classroom studied, the gender constructions of '*Machismo Masculinity*' and the relational '*Compliant/Resistant Femininity*' was shaped by the use of space. The girls complied with the dominant boys' control of space. When they became dutiful learners, they constructed a femininity of compliance to their schooling but this gave them a source of power. The boys interpreted this as the girls trying to show-off to the teacher and trying to be 'clever' in class. This in turn fuelled the boys' aggression who retorted with misogynist remarks, strengthening their own performance of the *'Machismo Masculinity'*.

4.3.3   LEARNER INTERACTIONS AND DOING GENDER:

'DUTIFUL GIRLS AND DISRUPTIVE BOYS'

In this study, most of the interactions between the girls and boys centred around their perceived interest and performance in the Physical Sciences subject. This became the basis for the performance of gendered violence by the boys as they performed their hegemonic masculinity.

From the data, most of the boys positioned themselves as disruptive, non-compliant learners. The girls however, positioned themselves as 'dutiful' and compliant learners. The boys perceived this as 'showing off' their 'cleverness'. Perceptions of girls' 'cleverness' became the basis for bullying which sometimes took the form of sexual violence that manifested as sexual harassment. Teasing and ridicule led to misogynistic discourses and the objectification of the girls. The data suggests that the struggle boys experienced with the inaccessible science lessons and their perceived powerlessness led to the construction of a hegemonic masculinity. Misogyny seemed to offer a way of producing a heterosexual expression. This is supported by the literature that confirms that heterosexual expressions are often defined through the exclusion and oppression of the girls (Jackson, 1998, p.80). From the data, the construction of the *'Compliant/Resistant Femininity'* by girls was in relation to the performance of the hegemonic *'Machismo Masculinity'*.

'Machismo Masculinity' was marked by a show of domineering control over the girls and anti-authority to rules, where these boys were deliberately uncooperative as learners. Most of the boys were disruptive and were disinterested in the lessons. These boys dominated the movement of the girls, classroom talk and more significantly, how

the girls learnt Physical Sciences. A few boys sat quietly and did not participate in an expression of the dominant masculinity but rather performed a subordinated masculinity. They were mostly quiet and stayed away from the girls. This was probably because boys who perform subordinated masculinities are often in danger of being labelled as feminine (Sewell, 1998). The dominant boys excluded these boys from their performance of the hegemonic masculinity and did not target them for their misogyny, as they did with the girls. From the data, boys who performed the subordinated masculinity were accepting and compliant, offering no resistance to the performance of hegemonic masculinity. In this study, the dominant boys stated that they did not feel threatened by the boys of the subordinated masculinity even though one of them was perceived to be 'clever' in Physical Sciences.

The constructions of '*Compliant/Resistant Femininity*' varied according to differentials of power. The girls switched between modes of compliance and resistance. The girls submitted to the bullying by the dominant boys in order to keep the peace. In this way, they complied with the performance of the hegemonic masculinity. Power can be seen to be exercised in actions (Foucault, 1980). The dominant boys, to sustain their dominance and power used low-grade violence against the girls. The girls stated that if they resisted, the bullying would turn into violent behaviour. In this study, violent behaviour was enmeshed with undertones of sexual harassment with a lower grade form of sexual abuse being reported by the girls. Repeatedly, notions of the girls' 'cleverness' emerged as the reason for the misogynist and bullying behaviour of the boys. The dominant boys also discussed some of the girls in terms of their appearance with sexual undertones. '*Machismo Masculinity*' manifested as a sexually aggressive and misogynist male. For most of the boys, the bodies of the girls became a significant site

for the imposition of their power (Butler, 1993). While most of the girls complied with the hegemonic masculinity, one of the girls, *'Pretty'* resisted the dominant boys' gendered violence. In doing this, she was subjected to ridicule and misogyny. According to her, her academic success empowered her to resist the boys' misogyny and sexual aggression, hence resisting the performance of the hegemonic masculinity. This was evident in her belief that the boys 'feared her cleverness'.

In this study, dominant notions of heterosexuality underscored most of the classroom interactions. Boys and girls are often subjected to the pressures of compulsory heterosexuality which involved projecting a heterosexual self (Renold, 2000, p.309). From the data, there were girls who participated in this by allowing the boys to touch them without resistance. This 'emphasised' femininity was marked by compliance to the dominant heterosexual *'Machismo Masculinity'*. Rather than perform a resistance to the boys, some girls used their sexual image as a source of power against the boys. O' Reilly et al. (2001) suggest that at puberty, girls often have to give up their self to become sexual objects. The literature suggests that the emphasised femininity often accommodates the interests of the hegemonic masculinity, enhancing its status (Reay, 2001). Some of the girls however, suppressed their heterosexual image and resisted the boys' advances. In the case of *'Pretty'*, she traded in her femininity for being 'clever'. To express her 'cleverness', she chose to downplay her femininity, became unpopular and was labelled as masculine by the boys. These girls had to balance being feminine with being 'clever' where the *'Machismo Masculinity'* boys did not value the expression of girls' 'cleverness'. For these boys, to be 'clever' was to be masculine.

In this study, the girls were optimistic of schooling and longed to attain the position of the independent individual with good career prospects. However, they entered a space that frequently reminded them of their gender. Their use of space was curtailed and their embodiment was controlled. Paechter (2006a, p.123) cites this as girls' bodies getting in the way of education, as things to be policed and subdued. The interactions between the learners lead to the construction of *'Machismo Masculinity'* and the relational *'Compliant/Resistant Femininity'.* In performance of the traditional masculinity, most of the boys maintained power and control over the girls through emphases on their sexuality. In this study, most of the girls and boys were reproducing traditional forms of gender. This is supported by the literature that suggests that in schools, young adults (re)produce the social relations of male dominance over females (Francis, 1998). The performance of gender becomes the re-enactment of meanings already socially established (Butler, 1993). In addition, while the study by Francis (1998) found constructions of 'mature' girls and 'immature' boys, in this study the emphasised femininity was also constructed as 'mature' but the boys constructed a hegemonic masculinity of gendered violence.

In this study, the hegemonic masculinity and the emphasised femininity were constructed not just in relation to each other but also in reaction to a more insidious and monolithic discourse of power, that is, the science lessons.

4.3.4 PHYSICAL SCIENCES AS A DISCOURSE OF POWER: THE 'OTHERING' OF BOYS AND GIRLS

The operation of hegemonic masculinity is marked by its differentiation from and privileging over feminism; the use of the body as a key signifier of being gendered and

the discourses of power that it identifies with and seeks alliance with; as well those that it opposes (Connell, 1995, 1996). In this study, the hegemonic '*Machismo Masculinity'* and the '*Compliant/Resistant Femininity* were at odds with the heteronormative masculinist school science. This is in contrast to other studies, which found that most boys could identify with the masculinist science taught (Fox, 2001, p.283; Letts, 2001, p.262; Murphy & Whitelegg, 2006, p.293).

In this study, both the boys and girls struggled with the decontextualised, difficult and abstract Physical Sciences even though they revered the science taught. To this, they positioned themselves in different ways. From the data, the *'Machismo Masculinity'* boys were disinterested in and rejected the science lessons. Even though the heteronormative science was 'masculine' in nature, the boys of the hegemonic masculinity were at odds with this science and resisted it through non-compliance. The girls, however, who performed their '*Compliant/Resistant Femininity'*, were dutiful and compliant to the authority of the 'difficult' and abstract science. The 'masculinist' Physical Sciences and the construction of '*Machismo Masculinity'* were markedly different. The hegemonic masculinity was marked by sexual aggressiveness and domination while the heteronormative science was authoritative, abstract, decontextual and powerful. The commonality to both was their subordination of femininity. The boys expressed their frustrations with the science and rejected the authoritative lessons, which were experienced as more powerful than their hegemonic masculinity. The data suggests that their experience of powerlessness positioned them in ways that were domineering and controlling of the girls. In this way, they performed their *'Machismo Masculinity'* in opposition to the science and the girls. The girls, however, when

confronted with the masculinist school science and uninteresting lessons, performed a traditional femininity where they were compliant to the science as dutiful learners.

4.3.4.1 THE NORMALISING DISCOURSE OF SCHOOL SCIENCE

School science can serve as a heteronormative masculinising practice by reinforcing hegemonic heterosexual masculinity (Letts, 2001, p.264). This masculinity is very powerful but not very visible. Letts (2001, p.264) argues that the heteronormative masculinity may victimise, silence and oppress but boys are just as much victims as are girls. He adds that many boys and girls are seduced by school science even though they may become victims of its practise (Letts, 2001, p.263). In this study, the learners saw school science as a prestigious academic gateway to a better life. School science has been critiqued for its androcentric epistemology and masculinist structure, which is value-laden, formal and abstract (Letts, 2001, p.263). In addition, school science is vested with high masculine status and power (Gilbert & Gilbert, 1998, p.19). In this study, the masculinist culture was reinforced through the Physical Sciences being an institutionally prestigious subject, giving the teacher authority and power. In the interviews, the girls stated their preference for being taught science by a female. However, they felt that she would become the victim of the boys' misogyny. This idea amused some of the boys who questioned what and how she would teach. The girls' responses from the girls-only interview indicated that the boys were disrespectful to female teachers of other subjects. They felt that the Physical Sciences teacher however, was shown more respect and tolerance. In this study, the learners engaged in listening, answering questions and the mastering of knowledge through repetition. The literature suggests that these activities enforce the teacher's authority in a traditional classroom (Carlone, 2003, p.32; Letts, 2001, p.269).

The gendered nature of science and schooling is complicit in the construction of certain masculinities (Letts, 2001, p.264). In this study, the inaccessible and difficult school science was viewed as the uncontestable 'truth'. This reinforced the performance of and colluded in the construction of the hegemonic heterosexual masculinity. Aggressive, disruptive boys who did not participate in the lessons constructed the *'Machismo Masculinity'*. When experiencing powerlessness in the class, the boys positioned themselves in opposition to the girls' compliance. In this way, the hegemonic masculinity contributed to the boys becoming agents of their own oppression (Paechter, 2006b, p.261). The performance of *'Machismo Masculinity'* gave them power over the girls by being misogynist and sexually abusive. Power was thus relational. The boys' powerlessness when confronted with the authoritarian teaching style and difficult science shifted to a position of powerfulness when they performed their *'Machismo Masculinity'*.

The literature suggests that often compliant females were a relational response to disruptive, non-compliant males (Tobin, 1995). In addition to this, participating in the normalising discourse of school science can reproduce prototypical meanings of science as authoritative and science learners as dutiful (Carlone, 2003, pp.19-20). In this study, even though the science taught and the way in which it was taught was oppressive, the girls became willing participants in the lessons. The classroom practices, which involved traditional teacher-directed lessons, implied meanings of science as an objective body of knowledge, which represented prototypical school science. In the classroom studied, the learners engaged in the science through listening and repeating facts, hence mastering a given body of knowledge as the 'truth' (Carlone, 2003, p.28).

These activities seemed to reinforced the authority of the teacher and the science. In addition, the teacher's authority was reinforced by his questioning patterns. In the classes observed, questioning was used to check the mastery of the learners' knowledge and maintain discipline. In reaction to this, the girls took up the role of the dutiful, compliant learner as they performed their '*Compliant/Resistant Femininity*'. The performance of '*Compliant/Resistant Femininity*' and *'Machismo Masculinity'* reproduced prototypical meanings of science as authoritative.

4.3.4.2 THE IGNOMINY OF 'TRYING HARD'

In this study, the girls struggled with the abstract, masculine science but suffered the ignominy of their efforts. They were mocked and ridiculed by the boys for being dutiful. Here, the '*Compliant/Resistant Femininity'* was defined by passivity, good behaviour and rule following. According to the boys, to be dutiful and hardworking was to be feminine. The data suggests that the traditional masculinity resisted any forms of behaviour that were deemed feminine, such as compliance to school work. The girls who were committed to learn were disadvantaged by the disruptive behaviour of the boys. They repeatedly expressed their frustration at being ridiculed for 'trying hard'. For these girls, learning became a struggle. In the girls-only group interview, the girls stated that they preferred to learn in a girls-only class and attend a girls-only school. They spoke of a popular Durban girls' school with reverence and quoted some girls who attended the school to have performed well in school. In the mixed group interview, the boys laughed at a boys-only school, saying that there would be no fun without the girls and that one African boy was labelled as homosexual because he attended a Durban school for boys.

4.3.4.3 'CLEVER GIRLS ARE MASCULINE'

In this study, the dominant boys perceived the 'clever girls' to be not as desirable as the 'not so clever girls'. The 'clever girls' were the object of misogynist taunts by most of the boys. One of these girls, *Pretty*, was labelled by the boys as "Mama Jack", a masculine female character from a film. They scorned at the girls' dutifulness. From perusing the test results, a few boys outperformed the girls, but the top performing boys were not subjected to the same ridicule as the girls who excelled in Physical Sciences. While the girls were derogated for working hard at Physical Sciences, the message from most of the boys was that to be 'clever' was to be masculine. This is supported by the literature that suggests that western science is associated with the mental ability and power of males (Letts, 2001). The boys in this Physical Sciences classroom exerted their power over the girls through the ridicule of their dutifulness. The girls had to learn Physical Sciences through wilfully resisting and being defiant to the boys. Here, *'Compliant/Resistant Femininity'* was performed in resistance to the hegemonic masculinity but in compliance to the 'masculinist' science.

In society there is an implicit message that girls who speak their minds will not be attractive to boys (O'Reilly et al., 2001, p.24). Both the boys and girls persistently made a distinction between the 'clever and not so clever girls' with the boys finding the 'not so clever' girls desirable. In this study, the girls who placed a high premium on academic achievement were unattractive to the dominant boys, who labelled them as masculine. This is in contrast to other studies that reported that boys regard learning as feminine pursuits (Jackson, 1998, p.89-90).

4.3.4.4   PHYSICAL SCIENCES AS ALLURING

Gordon's (2006, p.3) supposition that girls enter educational spaces with the expectation of attaining rational individuality as learners was also noted in this study with a further utilitarian need to succeed: science was viewed as the gateway to career success. Both the girls and boys were optimistic of schooling and hence desired education. However, they were confronted with a Physical Sciences that was difficult and disconnected from their lives, by which they felt defeated. Therefore, while they desired education that promised a better life they began to desire *in* education (Gordon, 2006, p.4). Their seduction by the school science also contributed to this desire to succeed. However, their involvement in this seduction positioned them as outsiders (Letts, 2001, p.262). Even as outsiders, they glorified the science and yearned to be successful in it. In addition to experiencing their femininity as an incursion, the science encountered by the girls alienated them further.

When the dominant boys became alienated from the pedagogy and content of the Physical Sciences lessons, they found an alternative power in which they objectified and exploited the girls. The relations of power between both the learners and the science taught contributed to the construction of traditional gendering. Science colluded in the girls' and boys' construction of '*Compliant/Resistant Femininity'* and *'Machismo Masculinity'*. Both the boys and girls were positioned as the 'Other' when confronted with the heteronormative 'masculine' science.

4.4   CONCLUSION

In this Chapter, I discussed and analysed the findings from the data within the theoretical framework of the study. In the next Chapter, I present a synthesis of the conclusions from the study, followed by a discussion of the implications for practice as well as the limitations of the study.

CHAPTER 5

SYNTHESIS AND CONCLUSIONS

In the previous Chapter, I analysed and discussed the results of the findings. This Chapter outlines a synthesis of the conclusions of the study. Following the conclusions is a discussion of the implications for practice and the limitations of the study.

5.1 INTRODUCTION

This study was located in a grade 10 Physical Sciences classroom, at *New Dawn Secondary School* from the Umlazi Township in Durban. The study explored the performances boys and girls engaged in as they constructed their gendering, through examining the researchable relations of power.

Specifically, this study sought to answer the following Research Question: *"What performances do the girls and boys engage in as they construct their gendering in the grade 10 Physical Sciences classroom?"* To respond to this question I employed a qualitative research methodology located within a poststructural feminist paradigm. The following is a synthesis of the key findings and conclusions of the research.

5.2 CONCLUSIONS FROM THE STUDY

This study explored how a particular group of grade 10 Physical Sciences learners constructed their gendering. I now discuss the conclusions reached from the study.

5.2.1 CONTESTED SPACES

The body was a significant site for the operation of power and the construction of masculinities and femininities. In this study, as agents and objects of space, bodies were constituted by their spatiality. In the performance of the hegemonic masculinity, these boys used the classroom space to exercise their power and control over the girls. The use of space was complicit in the construction of '*Compliant/Resistant Femininity'* and the relational *'Machismo Masculinity'*. Hence, contexts are important discursive spaces in the construction of gendering.

5.2.2 CONSTRUCTIONS OF GENDER

The boys and girls in this study exercised power that was shifting and constantly negotiated between them. In this study, the construction of masculinities and femininities were performative acts that were context dependent. The hegemonic masculinity was invested with power and it determined the agenda for the girls. In this study, the construction of the hegemonic masculinity was that of '*Machismo Masculinity'*. This masculinity was aggressive, persistent, authoritative and sexually assertive. The hegemonic masculinity was performed in relation to the emphasised '*Compliant/Resistant Femininity'*. This femininity was performed as a complex mixture of compliance and submission as well as resistance and opposition where the girls were subjected to misogyny, labelling and gendered violence by the boys. A few boys, however, performed the subordinated masculinity through quiet compliance. These boys existed in the margins and were excluded from the performances by the dominant boys.

5.2.3   PHYSICAL SCIENCES AS A DISCOURSE OF POWER

In this study heteronormative, masculinist Physical Sciences was experienced as abstract, difficult and irrelevant by both the boys and girls. Together with the teacher-centric lessons, the masculinist science colluded in the construction of the hegemonic masculinity and emphasised femininity rendering both the boys and girls as powerless. To this, the girls positioned themselves as dutiful and compliant and the dominant boys as disruptive and disinterested. The dominant boys perceived girls' academic success in the science taught as 'masculine'. These successful girls traded in perceptions of femininity for the label of 'masculine' when they resisted the gendered violence of the dominant boys. Their academic success was their capital and source of agency that gave them power over the sexually aggressive boys. Hence, for girls, success in Physical Sciences could be the source of their agency. In this study, it was a constant struggle for girls to learn Physical Sciences. They were subjected to harassment and ridicule and their morale devalued. The boys in this study were practising to become misogynist adult males who did not value girls' success. In the constructions of their gender, the boys and girls engaged in performances that were a re-enactment of some of the meanings already established in society.

5.3   IMPLICATIONS FOR CHANGED PRACTICES

Here, I recommend some implications for changed practices. I explore the notions of changing gendered behaviour, making school science more relevant and using pedagogies that enhance the learning experiences of both boys and girls.

5.3.1   GENDERED BEHAVIOUR CAN BE CHANGED

In this study, gender constructions were performative acts that were context dependent. Hence, if gender is socially constructed, dominant manifestations of that construction is open to contestation and challenge. Thus, we can start to challenge society's conception of gender and start to re-conceive and reconstruct gender roles in accordance with a more equitable system of power relations. This idea extends to gendered behaviour, which is produced from social relations, making gender relations alterable and open to improvement.

In this study, masculinities were fluid and constantly negotiated. This conceptualisation provides space for activism because it acknowledges the possibility of intervening in the politics of masculinity to promote masculinities that are more peaceful and harmonious (Reay, 2001, p.128). For researchers the challenge is to, firstly identify the different forms of masculinities and then to identify what conditions operate to effect changes.

Concluding from this study, the view that stereotypical behaviour can be explained in terms of gender role performance, we would be able to effect change through interventions and possibly reduce the frequency of extremes of masculine or feminine performance in young people. In classrooms, learners could be sensitised to performances of gender roles especially those that are extreme.

**5.3.2   GENDER IN SCHOOLS: TOWARDS A GENDER-INCLUSIVE
            CURRICULUM**

Poststructuralism draws our attention to why equal opportunities strategies have not proved fully effective in challenging traditional gender stereotyping (Francis & Skelton,

2005; Paechter, 2006b). Equal opportunities programmes were based on the idea that to disrupt traditional gender attitudes and behaviours, all teachers had to do were to introduce children to non-sexist images of masculinity and femininity (Francis & Skelton, 2005, p.32). In contrast, gender as 'performed' enables the questioning and challenging of gendered discourses, facilitating the confrontation of stereotypical and conventional constructions of gender.

Authoritarian types of classrooms, as was evident in this study, help create a 'macho' mode of masculinity (Mac an Ghaill, 1994, p.56-59). The authority figures, such as the male teacher in this study, who deliver high status areas of the curriculum such as science collude in contributing to the 'macho' mode of masculinities (Letts, 2001, p.264).

Central to any educational strategy should be a focus on the curriculum. Curricular justice could mean organising knowledge from the point of view of the least advantaged (Paechter, 1998, p.96). However, we do not have to abandon existing knowledge, but we need to reconfigure it. A gender-inclusive science curriculum where the curriculum inverts hegemony that characterises dominance should be embraced.

5.3.3   SCHOOL SCIENCE NEEDS TO BE MORE RELEVANT

It is difficult to escape from gender in a society where gender is an all-pervading construct (Mlamleli, 2000, p.5). Science has also been affected (Letts, 2001, p.261). In the development of modern science, gender constructs interacted with societal elements to establish its dominant values, placing science in a masculine context (Letts, 2001, p.261). This science has been filtered down to school science.

School science needs to be more relevant and appealing to all those who study it. This entails some fundamental changes to the science that is presented as objective and dispassionate. In addition, there needs to be a review of the status of scientific knowledge, especially in terms of its philosophical underpinnings. More importantly, school science needs to be more relevant to the lives of the learners who study it, making it accessible and pragmatic to the needs of learners. The contexts from which the learners come from should be the starting point for lesson design. This ought to become the focus of curriculum designers and authors of textbooks who ought to move beyond rhetoric. Often this is in the form of superficial window-dressings that purports contextual relevance but in fact merely display 'Africanised' names and pictures of African learners.

5.4   CONCLUSION

The girls in the grade 10 Physical Sciences classroom studied engaged in performances of compliance and resistance as they constructed the '*Compliant/Resistant Femininity'*. Most of the boys however, engaged in the performance of the sexually aggressive, misogynist and heterosexual '*Machismo Masculinity'* while excluding the boys who performed the compliant masculinity in the margins. In this study, the constructions of gender were relational and context dependent. The contexts of space, the science studied and the interactions between the learners shaped the constructions of gender.

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APPENDICES

1.   Ethical Clearance Certificate

1.1   Approval to Conduct Research: KZN DoE

1.2   Permission to Conduct Research at the School

1.3   Parental Consent for Learners' Participation

2.   Research Instruments

2.1   Observation Schedule

2.2   Narrative Schedule

2.3   Interview Schedule: Girls' Individual Interview

2.4   Interview Schedule: Focus Group of Girls only

2.5   Interview Schedule: Focus Group of Girls and Boys