# THE IMPACT OF GRADE 10 LEARNERS' BEHAVIOUR ON THEIR ACADEMIC PERFORMANCE IN MATHEMATICS

by

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# DECLARATION

I declare that the project "*The impact of Grade 10 learners' behaviour on their academic performance in mathematics*" is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references**.**

…….. ……

Mr F Hagoramagara Date

# DEDICATION

This work is dedicated to four most important persons in my life:

My wife, Marie Chantal Tabu

Our three sons

Frank Iradukunda, Charlot Irafasha and Marius Hagoramagara

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# ABSTRACT

The aim of this study was to identify types of behaviour manifested by learners during mathematics instruction, and the impact that this behaviour might have on the mathematics performance of learners. The study was conducted in Far East cluster of Johannesburg East District, in the province of Gauteng, South Africa. At the time of the study the Far East cluster of Johannesburg East District consisted of a population of seven public high schools, of which two schools were randomly sampled to participate in the study.

Participants consisted of (n=10) Grade 10 mathematics learners, 2 mathematics teachers and 2 heads of mathematics departments (HODs). Data from learners were collected using a set of their assessment scores accumulated over a period of six months, that is, from January 2014 to June 2014 (Section 1.3.3). Also, semi-structured interviews were carried out with learners to determine types of classroom behaviour they perceived to influence their mathematical performance. The aim of documenting learners' assessment scores (document analysis) was to determine their average performance in Grade 10 mathematics over a stipulated period. Teachers and HODs completed questionnaires to identify types of classroom behaviour that learners manifested during mathematics instruction.

The study followed a qualitative approach with phenomenology research design (Section 3.2). The study identified several types of classroom behaviour that characterized mathematics instruction in both schools, such as making noise and not doing classwork and homework activities. In addition, the study established that forms of behavioural patterns that are manifested by learners during a mathematics instruction influenced their performance in the subject. Huitt's (1997) model was used to conceptualize and interpret the results.

# KEY WORDS

Grade 10 mathematics

Learners' behaviour

Poor performance in mathematics

Disruptive classroom behaviour

Lack of concentration

Learning and teaching environment for mathematics

Academic performance

Johannesburg East District

# ACRONYMS AND INITIALISMS

| | |
|---|---|
| ANA | Annual National Assessment |
| ALT | Academic Learning Time |
| CAPS | Curriculum and Assessment Policy Statement |
| DBC | Disruptive Behaviour Checklist |
| DBE | Department of Basic Education |
| GET | General Education and Training |
| FET | Further Education and Training |
| HOD | Head of Department |
| NCS | National Curriculum Statement |
| Ofsted | Office for Standards in Education |
| PCK | Pedagogical Content Knowledge |
| PPS | Poor performing school |
| TIMSS | Trends in International Mathematics and Science Study |
| RCL | Representative Council of Learners |
| SACE | South African Council for Educators |
| SASA | South African Schools Act |
| SADET | South African Democratic Education Trust |
| SAPS | South African Police Service |
| SAQA | South African Qualification Authority |
| SMT | School Management Team |
| WEF | World Economic Forum |
| WPS | Well Performing School |

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# CHAPTER 1

# INTRODUCTION

## 1.1 OVERVIEW OF THE STUDY

Learners' classroom behaviour has become a global concern as it is thought to have a bearing on academic performance (Charles, 2014; Flynt, 2008; Singh & Steyn, 2014). The aim of the study was to identify types of behaviour manifested by learners during mathematics instruction, and the impact of this behaviour on the mathematics performance of learners. In the context of this study the word *impact* is used to refer to the extent to which study participants perceived the influence of learners' behaviour over learners' mathematics performance (see Section 1.10.2). Hence the word *impact* should not be conceived as implying that the current study followed an experimental research design in which rigorous statistical procedures were employed to test the significance of the impact of one variable over the other (see Section 3.2). The impact of classroom behaviour on mathematical performance of learners is tentatively determined through interview interactions between learners and the researcher (Section 3.4.2.3). This determination is made in the wake of other supporting data elicited through triangulated data-collecting sources (see Section 3.4.2).

Participants consisted of 10 Grade 10 learners, 2 mathematics teachers and 2 heads of mathematics departments (HODs) from two schools in Johannesburg East District in the province of Gauteng,[1] South Africa (see Section 3.3). The two schools were randomly sampled from a district that consisted of seven secondary schools (see Section 3.3.1.1; see also Figure 3.1). One school in the study was performing badly in Grade 10 mathematics yet its counterpart was performing well in the subject at the same grade level. Schools that projected contrasting performance indicators in Grade 10 mathematics were considered to see if these varying scholastic performances could be linked to general behavioural patterns observed in the two schools (Section 3.3.1.1). The study followed a qualitative research methods combined with a descriptive survey research design that embraced aspects of

1. Gauteng is one of the nine provinces of South Africa.

descriptive methodology (Section 3.2). Data from teachers and HODs were collected using self-reporting questionnaires (Section 3.4.2.2). Data relating to learner performance were collected by means of semi-structured interviews and document analysis of learners' assessment scored accumulated over a period from January 2014 to June 2014 (see Section 1.3.1; Section 1.3.3; Section 3.4.2.1; Section 3.4.2.3; Section 4.4). The study found that mathematics instruction in participating schools was characterized by various types of learners' classroom behaviour, which tended to affect their performance in mathematics.

## 1.2 AIM OF THE STUDY

The aim of this study was to identify types of behaviour manifested by learners during mathematics instruction, and the impact of this behaviour on mathematics performance of learners. In the context of this study the word *instruction* refers to the classroom activity of teaching and learning, involving a teacher and a learner (see Section 1.10.1).

## 1.3 OBJECTIVES OF THE STUDY

To achieve the aim of the study, the following objectives were set out:

**1.3.1** To identify types of behaviour pattern that Grade 10 learners possibly manifested during mathematics lessons;

**1.3.2** To determine the perceptions of teachers and HODs on the types of lesson-related behaviour identified by learners;

**1.3.3** To determine the performance of Grade 10 mathematics learners by analysing recorded mark sheets over a six-month timeframe; and,

**1.3.4** To determine factors that Grade 10 learners view as influencing their performance in mathematics.

## 1.4 CONTEXTUAL BACKGROUND OF THE STUDY

Learners' performance in mathematics has become a global concern. In South Africa it is a worrying matter for all stakeholders in education, ranging from learners to the Ministry of Basic Education. For instance, the report of the Annual National

Assessment (ANA[2]) noted that "as baseline, the average of 13% at Grade 9 levels was worryingly low" (ANA, 2012, p. 24). The preceding report was triggered by learners' poor mathematics performance in the 2011 ANA tests. The consequences and severity of learners' poor performance in Grade 9 mathematics were also highlighted by the then[3] minister of basic education, who noted, "These results explain to a large extent why, among many other reasons, we have such high failure and dropout rates at Grades 10 and 11" (ANA, 2012, p. 2).

Reports by the World Economic Forum (WEF) have also shone a spotlight on South African learners' poor performance in mathematics (WEF, 2013, 2014). The 2013 and 2014 reports ranked South Africa second from last in the world and in last place, respectively, in terms of world participation in mathematics education competition, although South Africa has good economic standing on the African continent. On the global stage South African learners have persistently displayed patterns of poor performance in mathematics. Thijsse (2011) reported that in an international study involving Grade 7 and Grade 8 learners from 41 countries in which the mathematical proficiency of participants was tested, South Africa scored lowest. South African participation in previous Third International Mathematics and Science Studies (TIMSS) has highlighted serious gaps in learners' mathematical knowledge. Given these observations, TIMSS (2011, p. 117) noted, "The performance levels of learners in mathematics and science in South Africa are very low" (p. 117).

Several variables are associated with learners' poor performance of mathematics in schools, and some of these have been highlighted in TIMSS reports (for examples see TIMSS, 2011). One such variable is the classroom behaviour of learners during mathematics instruction, which is well documented in educational studies. For instance, Mkhize (2002) stated that good behaviour could be linked to high standards of performance by learners. Singh and Steyn (2014) reported a link between poor performance and learners' classroom behaviour.

2. Annual National Assessment (ANA) consists of a set of state-regulated standardized tests that are written annually in certain subjects by certain groups of learners (in terms of grade level) in South Africa (see Section 1.11.5).
3. The study that is reported here was conducted between 2013 and 2015.

Learners' classroom behaviour, which may influence their scholastic performance, could be the result of various experiences in their lives (Singh & Steyn, 2014). In South Africa the experiences of apartheid[4] in the education system have been linked to learners' poor performance in mathematics (Giliomee, 2011; Mandela, 2004). The latter are thought to have played a part in generating certain behavioural patterns that are educationally counterproductive to certain groups of learners. For example, the race conscious comment by the then minister of native affairs, Dr Hendrik Verwoerd who is considered the architect of the Bantu[5] Education Act[6] of 1953, is believed to have had an influence in generating negative behaviour and unbecoming attitudes for the group of learners who belong to the section of the society to whom the comment was directed:

> There is no place for [the Bantu] in the European community above the level of certain forms of labour … what is the use of teaching the Bantu child mathematics when it cannot use it in practice? That is quite absurd. Education must train people in accordance with their opportunities in life, according to the sphere in which they live (Ross, 2011, p. 340).

Giliomee (2012) noted that this comment by Dr Hendrik Verwoerd generated negative attitudes, misconceptions and mathematics phobia among South Africans, particularly black learners (Bantu children) in disadvantaged or poor socioeconomic backgrounds. The legacy of the Bantu Education Act of 1953, and the controversial utterances of the former Minister of Native Affairs, can still be observed in the low levels of classroom behaviour of many learners in South African mathematics classrooms, and the subsequent poor performance that is seemingly the product of this behaviour.

4. Apartheid is the system that elevated white people, while marginalising black communities in South Africa.
5. The word *Bantu* was used in this context, and in many instances relating to the apartheid era, to refer to the Black African communities, both children and adults (see Byrnes, 1996).
6. The Bantu Education Act of 1953 was an apartheid crafted legislation intended to separate education on racial grounds by advocating an educational approach of preferential treatment. This act ensured that black South Africans benefited less from a comparatively well-resourced education system that was enjoyed by the white people. As a result, black learners received inferior education compared to their white counterparts and performance gaps were significant in scholastic terms (Hartshorne, 1992).

In response to the apartheid-inspired laws of education, predominantly black political movements have used children to advance their political agenda. However, this revolutionary strategy has had undesirable outcomes on children's classroom behaviour, and also on their scholastic performance. According to the South African Democratic Educational Trust [SADET] (2013), the prevailing climate of poor behaviour in South African classrooms can be attributed to a past political landscape that called for black consciousness, youth uprisings, liberation movements and revolutionary actions against the apartheid system of education. These observations are corroborated by Rossouw's (2003) study, which found that the involvement of youth in the liberation struggle that ended in 1994 caused learners to develop arrogance towards teachers and parents, thus lowering performance levels in education. Rossouw (2003) added that this decline in the level of discipline and behaviour in recent years could be linked to an overemphasis on human rights, especially children's rights, in reaction to the increase in child abuse and lack of a human rights culture in the apartheid era. It seems political events may have a way of influencing learners' classroom behaviour that could subsequently play a role in shaping and determining their scholastic performance.

Problems associated with learners' classroom behaviour have aroused global concern. Andreason (2011) noted that one of the major problems that the educational systems all over the world face today is learners' classroom behaviour. Worldwide trepidation about the lack of discipline by learners is increasing (Stewart, 2004). Rossouw's (2003) study emphasized that a decline in learners' behaviour may seriously hamper the teaching and learning processes. According to Rossouw (2003), if disruptive behaviour prevails, education cannot be successful. Mkhize (2002) agreed that good performance by learners in academic and extracurricular activities is not likely to take place without discipline in schools. Therefore the variable of classroom behaviour seems to present an alternative avenue to explore in order to address global concern about mathematics performance in schools, particularly in South Africa.

Various post-apartheid ministers of basic education have made efforts to improve learners' performance in mathematics. These initiatives have included constant revision of the curriculum, and assigning larger percentages of gross domestic product (GDP) to education than any other African country (Jansen & Blank, 2014).

In 2001 the Department of Basic Education (DBE) outlined the National Strategy for Mathematics, Science and Technology Education in General Education and Training (GET)[7] as well as in Further Education and Training (FET)[8] (DBE, 2001). The purpose of the DBE strategy was to increase participation in mathematics and the pass rate of learners who enrol in the subject. In 2005, under a new ministry, the DBE introduced the National Strategy for Mathematics, Science and Technology Education to increase the number of learners who were passing high-level mathematics (DBE, 2006; DBE, 2001). In 2013, the current minister of basic education established a ministerial committee to investigate the implementation of mathematics, science and technology curricula in schools (DBE, 2013). The main mandate of the committee was to monitor Grade 9 interventions and to recommend support mechanisms that would be used to improve learners' performance (DBE, 2013).

Furthermore, the current minister of basic education has emphasized the importance of taking mathematics as a subject of choice when learners complete Grade 9 and are starting Grade 10, which signals the beginning of the FET programme in which learners are prepared for higher education (ANA, 2013; see also DBE, 2001). Even though these could be noble and justifiable educational initiatives, they seem to have paid little attention to the variable of learners' classroom behaviour as a possible determinant of learners' performance in mathematics. None of the recent educational initiatives has paid attention to the influence of learners' unbecoming classroom behaviour, with a view to elevating learners' performances in a critical subject such as mathematics. Given this background, the researcher noted that the paucity of such initiatives highlighted a gap in terms of the research needed to explore a possible relationship between classroom behaviour and scholastic performance (in the South African context). The researcher anticipated that such a study could be of benefit to the curriculum and policy designers in South Africa.

7. According to South African Qualification Authority [SAQA] (2001), General Education and Training (GET) is a school phase in South African schools from Grade 7 to Grade 9. At this level a generalised package of nine school subjects is offered. During this phase learners are empowered with knowledge that enables them to choose the career when they reach Grade 10 and proceeding to Grade 12.

8. Further Education and Training (FET) is a school phase covering Grade 10 to Grade 12. The FET phase focuses on learners' future careers and prepares them for tertiary education. At this level education is more focused and is beginning to be more career-specific. Learners may choose the subjects that are linked to their tertiary education. However, the choice of subjects is determined largely by performance in Grade 9.

Given this background, the current study acknowledged the significance of mathematics as a tool to cope with modern-day living, hence the need to elevate learners' performance in mathematics by examining and improving their classroom behaviour formed the focus of this study. Gouba (2008) points to the importance of mathematics in many aspects of everyday life of the twenty-first century, be it in the technological world, in its use to appreciate beauty, in the environment, and in planning the future. Gower (2007) describes mathematics as the key subject to all science-related fields, and emphasizes that mathematics is connected to everything.

## 1.5 STATEMENT OF THE PROBLEM

In an attempt to improve learners' performance in mathematics, South Africa has implemented various curriculum programmes in its first two decades of democracy (from 1994 to 2015). However, poor performance in mathematics, and most notably low levels of learners' classroom behaviour, has continuously presented areas of great concern. This could present the teaching profession as a daring career for one to choose. A study conducted by the South African Institute of Race Relations in 2008 found that South African schools are among the most dangerous in the world (Singh & Steyn, 2014). Incidents of gangsterism are gradually becoming the norm. Such incidents seem to impact negatively on the scholastic performance of learners. Mncube and Madiya (2014) noted that a rapid increase in gangsterism in South African schools in the post-apartheid era is a contributing factor to the academic underperformance by learners. Some researchers have warned that South African schools gradually resemble war zones (for examples see Khuluse, 2009; Maree, 2000; Mncube & Madiya, 2014). In the same vein, one local newspaper reported incidences in which learners have recently risen against their teachers in some schools in Johannesburg (Veriava, 2013, October 11). Hence this study viewed learners' classroom behaviour in some schools in South Africa as a problematic area that required systematic scientific inquiry.

In the same vein, being a high school mathematics teacher, the researcher has observed many instances of poor behaviour displayed by Grade 10 learners in mathematics classrooms. In some instances, incidents of learners' poor behaviour in mathematics lessons have manifested themselves in the forms of involuntary disruptive tendencies toward their fellow classmates and anti-social behaviour that is

intended to disrupt or to slow down the teaching and learning of mathematics. In turn the researcher observed that whether learners' types of behaviour are intentional or not, they may contribute to poor learner performance in mathematics.

Given that some researchers agree that learners' negative behaviour during mathematics lessons could be linked to the political past, which was characterized by racial tension and sporadic acts of intolerance (Clark & Worger, 2004; Crais & McClendon, 2014), it may pose a challenge in establishing the construct of learners' desirable classroom behaviour. According to Gross and Pelcovitz (2012), teachers' perceptions of learners' inappropriate classroom behaviour may be ambiguous, distorted or contextually based. What is perceived as serious disturbing learners' behaviour by some teachers may be tolerated by others (Gross & Pelcovitz, 2012). The Office for Standards in Education [Ofsted] (2014) observed that teachers, school leaders and parents have different opinions on what is regarded as a low level of learners' classroom misbehaviour. This causes inconsistency in the approach taken by the school management to establish an environment that is conducive to learning a crucial subject such as mathematics. The researcher finds it really worthwhile to investigate the collective views of Grade 10 learners, teachers and HODs on what is perceived as learners' misbehaviour in mathematics lessons.

## 1.6 RATIONALE FOR THE STUDY

The performance and classroom behaviour of high school learners in mathematics continue to be topical issues in South Africa. Even though Grade 12 learners' mathematics performance has shown some improvement recently, the performance of Grade 9 learners in mathematics in the recent ANA examinations continues to bother all educational stakeholders. The mathematics performances of Grade 9 learners in the ANA tests in 2012, 2013 and 2014 were 13%, 14% and 10.8%, respectively (see ANA, 2013; ANA, 2012; DBE, 2013; see also Section 1.10.5). When compared with the mathematics performance of Grade 12 in the same years, which were 56%, 59.1% and 53.3%, respectively, one realizes that the performance gap is enormous (DBE, 2013).

Recent studies have focused on teachers' pedagogical content knowledge (PCK) (for examples see Makina, 2013; Ogbonnaya, 2009; Sibuyi, 2012). These studies have emphasized the importance of the variable of teacher characteristics such as

the teacher's background, teacher's classroom education and qualifications, teacher's subject majors, teacher's practice and experience, and the nature and quality of professional development by the teacher to improve learners' performance in mathematics. While the importance of teacher characteristics may not be substituted in mathematics instruction, it may be necessary to look into the learner characteristics that have potential to influence scholastic performance (see Figure 2.2). The current study investigated the types of learner characteristics, in the form of exhibited classroom behaviour, that influence the performance of Grade 10 learners in mathematics.

## 1.7 RESEARCH QUESTIONS

The main research question for this study was:

> *What impact does Grade 10 learners' behaviour have on their performance in mathematics as perceived by Grade 10 mathematics learners and teachers in Johannesburg East District?*

To address the main research question of the current study the following sub-research questions were formulated:

**1.7.1** What do Grade 10 learners view as predominant types of misbehaviour during their mathematics lessons?

**1.7.2** What are the perceptions of mathematics HODs and teachers of the types of misbehaviour identified by the learners during mathematics lessons?

**1.7.3** What is the general performance of Grade 10 mathematics learners in each of the selected schools?

**1.7.4** What factors do Grade 10 learners perceive as influencing their performance in mathematics?

## 1.8 SIGNIFICANCE OF STUDY

The current study has significance for all South African educational stakeholders interested in improving learner performance in mathematics in the following areas: (i) school managers and mathematics teachers could use this research to monitor and predict the possible mathematics performance of learners in relation to behavioural

patterns they depict during instruction; and, (ii) education policy makers could use this research to model and recommend a generally acceptable learner code of conduct to benefit mathematics instruction.

## 1.9 DELIMINATION OF THE STUDY

The current research was conducted in Johannesburg East Educational District, in the province of Gauteng, South Africa. This district consists of five clusters of schools and the Far East Cluster, which consists of seven public secondary schools, was selected as the site of research for the current study.

## 1.10 DEFINITIONS OF OPERATIONAL TERMS

While conceptual definitions give the meanings of the words, operational definitions permit investigators to measure abstract constructs, thus allowing them to proceed with investigations that might not otherwise be possible (Ary, 1990). The meanings and operational definitions of key terms used in the current study are listed in the next sections.

### 1.10.1 Mathematics instruction

In Section 1.1 the word *instruction* was presented as referring to any activities that characterize teaching and learning in the context of the current study. For instance the phrase *mathematics instruction*, which is popularly used in this report, referred to classroom activities of teaching and learning that naturally involve a mathematics teacher and learners. This could be the facilitation of a mathematics lesson by the teacher or learners involved in a mathematical task of problem solving. Hence in other instances the phrase *mathematics lesson* is used interchangeably with the phrase *mathematics instruction* in this report.

### 1.10.2 The impact of behaviour on mathematics

In Section 1.1 it was explained that the use of the word *impact* in this report is not intended to evoke a perception that this research followed an experimental design in which rigorous statistical procedures could have been employed to test the impact of one variable over the other (see Section 3.2 for the design of this study). An ordinary meaning of the word *impact* is conceived and used in this study. Among this set of meanings, the word could simply be construed as referring to *a general influence of one thing over the other* (see Encyclopaedia Britannica, 1998, for related general

meanings). Encyclopaedia Britannica (1998) defines *impact* as “an effect or an influence of one thing on other” (volume 3, p. 212).

It should be emphasized that in this study the general influence of classroom behaviour on learners’ mathematical performance is not measured through statistical means. This influence (impact) is proclaimed and documented using interview data in which learners revealed their views of their perceived link between classroom behaviour and mathematical performance (see Section 3.4.2.3; Section 4.5). In particular, the researcher chooses to use the word *influence* (as opposed to *impact*) in Section 4.5 when documenting participants’ views that emanated during interview sessions. This style of reporting should be viewed as demonstrating the interchangeableness in which the two words are used in this dissertation (see also Section 2.6). Other studies have documented participants’ perceptions to investigate the *impact* of learners’ behaviour on classroom culture and learning using survey method (see Langley, 2008; Ofsted, 2014; Singh & Steyn, 2014). These studies have used a qualitative approach to investigate the impact of one variable over the other.

### 1.10.3 Types of classroom behaviour during mathematics instruction

Tiwani (2011) describes behaviour as the manner in which learners relate to their peers, parents, family members, teachers, and other members of the school community. This study focused on types of behaviour that learners manifest during a mathematics lesson or mathematics instruction (see Section 1.2). In terms of this focus learners’ behaviour would be confined to the manner in which learners relate to their peers and to their teachers during a mathematics lesson (Tiwani, 2011). This study identified three main categories into which learners’ inappropriate classroom behaviour could be classified during mathematics instruction: (i) disruptive behaviour; (ii) lack of concentration; and, (iii) anti-social behaviour.

In terms of this study the classification of learners’ classroom could be explained as follows. First, all three types of classroom behaviour were considered to be occurring during a mathematics lesson. Second, (i) *lack of concentration* was considered to be the type of behaviour that a learner would experience without affecting a teacher or another learner. This form of behaviour was considered to occur at individual level. Examples included being bored or not being attentive during mathematics lessons;

choosing not to engage in classroom activities; and pursuing personal activities (see Appendix E). (ii) *Disruptive behaviour* was considered to be the form of behaviour that would affect other learners during the course of the lesson. Unlike lack of concentration, disruptive behaviour was not considered to be occurring at personal level. Other learners would be directly affected by this form of behaviour. Examples included being talkative during a mathematics lesson, and making purposeless movements during class (see Appendix E). (iii) Antisocial behaviour was considered to be the form of behaviour that would mainly affect the teacher. In this case, a learner could choose not to take instructions from the teacher or could be seen to be bringing out-of-class tendencies into the lesson such as gambling or bullying other learners (see Appendix E).

### 1.10.4 Grade 10 mathematics

The Oxford English Dictionary (2013) definition of mathematics was adopted in the current study. Hence mathematics was defined as the science of numbers and shape, or the process of calculating using numbers (Oxford English Dictionary, 2013). The researcher also incorporated Forgasz's (2008) explanation that at secondary school level, mathematics is divided into the study of space and change. The latter includes algebra, geometry, trigonometry, number pattern functions and statistics.

At the time of doing this study South Africa placed high importance in doing mathematics at Grade 10 level. Mathematics at this level is regarded as opening educational opportunities for learners to make career choices. In Grade 10 new mathematical topics are introduced in the syllabus for the first time such as analytical geometry, trigonometry, and quadratic, hyperbolic and exponential functions (DBE, 2013, 2006).

### 1.10.5 Academic performance

In this study academic performance was conceptualized as a quality determined by looking at the outcome of student evaluation (Potokri, 2011). In terms of the current study, academic performance referred to the evaluation of the performance of Grade 10 mathematics learners who participated in the current study. To make this determination, three areas of learner assessment were established (Cuttance, 2005), namely i) evaluation of cognitive outcome, which is used to assess mental skills and

knowledge; ii) evaluation of the affective outcome, which assesses learners' growth in feelings and emotional areas, including their attitudes; and iii) evaluation of the social outcome, which is used to assess students' creative skills. Given the focus of the current study, the researcher considered Potokri's (2011) contribution that the most common outcome evaluation to assess learners' performance in school is cognitive. Hence in this study, references to learners' performance refer largely to their cognitive outcomes.

### 1.10.6 Annual National Assessment

The Annual National Assessment (ANA) tests are national strategic tools introduced in 2008 by the Ministry of Basic Education to monitor and improve the quality of teaching and learning in schools (ANA, 2013, 2012; Pausigere & Graven, 2013). ANA is a set of grade-specific state-mandated language and mathematics tests for Grade 1 to Grade 6, and Grade 9 learners with the focus on fundamental skills of literacy and numeracy (ANA, 2012). ANA can be regarded as a national diagnostic instrument to asses and detect learner problems, and subsequently predict learners' possible future performances.

The ANA results of Grade 9 mathematics of the year that preceded this study were used in this study to create the context for the study (see Section 1.1; Section 1.4). In addition, the ANA results were used to determine the baseline performance of learners who participated in the current study.

## 1.11 STRUCTURE OF THE DISSERTATION

The final report of this dissertation is organized as follows. Chapter 1 presents an overview summary of the current study by providing an outline of the problem statement, the aim and objectives of the study, and the significance of the study. In addition, this chapter provides the research questions and hypotheses statements guiding the study. Chapter 2 provides a review of the literature on learners' classroom behaviour and how this variable influences learners' performance in mathematics. Chapter 2 also presents the conceptual framework for the study, and further explores various theoretical perspectives to explore the influence of learners' behaviour on the academic performance in mathematics. Chapter 3 presents the research methodology and the design for the current study. The following issues are addressed in Chapter 3: The study population and sampling procedures,

instrumentation, data collection and data analysis. In Chapter 4 the analysis of data and the presentation of the results of the study are provided. In Chapter 5 the findings of the study are discussed in terms of the research questions, aim and objectives of the study. The discussion of the findings is followed by conclusions, limitations of the study and recommendations, respectively.

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 INTRODUCTION

According to Drew, Hardman and Hosp (2008), a literature review gives an overview of articles, books and chapters that the researcher has read and interpreted, and those that are relevant to the study and the topic under investigation. A literature review demonstrates the researcher's knowledge of the field under investigation and positions the study in the context of that field of inquiry at a particular time (Atkins, 2012). In this chapter related literature on learners' behaviour during mathematics instruction and on how learners' behaviour affects performance in mathematics are reviewed.

## 2.2 CLASSROOM BEHAVIOUR AND PERFORMANCE IN MATHEMATICS

Several studies have linked learners' behaviour to poor performance in general (see Table 2.1 for summary). However, few studies have documented a direct link to poor performance in mathematics. This section uses existing literature to explore factors that contribute (i) to learners' general behaviour in the classrooms; and, (ii) to poor performance in mathematics. This review shows a substantial link between factors that are identified to account for learners' negative classroom behaviour and those linked to learners' poor performance in mathematics classrooms. For instance, Tiwani (2011), Yahaya (2003) and Zikhali (2006) studied factors influencing learners' behaviour in schools and identified the following dominant factors: the attitude of learners; teacher attitude and qualifications; subject factors; types of friends; and family and school climate. Similar factors were identified by some of the related studies on factors that lead to poor performance in mathematics (for examples see Mapaire, 2012; Mbugua, 2012; Thijsse, 2011; Umameh, 2006; Zan & Di Martino, 2007). Largely these studies identified the following factors: learners' attitudes and commitment; methods of teaching; educational facilities; learners' socio-economic factors; parent or guardian factors and school environment factors (see also Table 2.1).

***Table 2.1: Studies linking learners' behaviour and mathematics performance***

| ***Classroom factors linked to poor performance in mathematics*** | ***Classroom causes of learners' behaviour in schools and classroom*** |
|---|---|
| **Learners' factors:** Mbugua (2012); Thijsse (2011); Umameh (2006); Zan and Di Martino (2007); etc. | **Learners' factors:** Zikhali (2006); Packer (2004); Yahaya (2003); etc. |
| **Teachers' personality and teaching methods:** Mapaire (2012); Thijsse (2011); Mwiria (2006); Umameh (2006); etc. | **Teachers' personality and teaching methods:** Tiwani (2011); Packer (2004); Yahaya (2003); etc. |
| **Factors relating to curriculum:** Mbugua (2012); Musasia (2012); etc. | **Curriculum content factors:** Tiwani (2011); Packer (2004); etc. |
| **The influence of educational policies:** Musasia (2012); Mapaire (2012); etc. | **The influence of educational policies:** Tiwani (2011); etc. |
| **Peer group characteristics:** Fox, Vos and Geldenhuys (2007); etc. | **Peer group characteristics:** Tiwani (2011); Packer (2004); Yahaya (2003); etc. |

The preceding discussion provides insight into the possible link between factors associated with learners' misbehaviour in the classroom and those associated with poor performance in mathematics classrooms (see Table 2.1). Factors linked to classroom misbehaviour are seemingly associated with factors linked to poor . performance in mathematics classrooms. Sullivan, Johnson, Owens and Conway's (2014) ecological approach in Figure 2.1 is used to explore the possible association between: (i) factors linked to classroom misbehaviour during mathematics instruction; and, (ii) factors linked to poor performance in mathematics classrooms.


***Figure 2.1: Sullivan et al.'s model of classroom behaviour***
***Source:*** *Sullivan et al. (2014)*

According to Sullivan *et al*.'s ecological model, the classroom could be thought of as an ecosystem. The notion of ecosystem is closely linked to two or more organisms in the environment that depend on one another for survival (Macmillan Dictionary, 2002).The classroom ecosystem may involve the interactions between the physical environment, consisting of the teacher characteristics, curriculum, teaching methods, instructional resources and a multitude of other learners' variables (Sullivan *et al*., 2014). In the context of this study, a learner may display misbehaviour in a mathematics lessons because of not coping with the teacher's method of teaching. Hence it may be true that learners who misbehave during a mathematics lesson may find it difficult to understand even the best teacher. Similar "reciprocity between factors that influence learners' poor performance and those that influence learners' behaviour" can be demonstrated (see Hergenhahn, 2005, p. 348). Using an ecological approach it is evident that any effort to improve learners' performance in mathematics may be linked to improving learners' behaviour during teaching time.

## 2.3 FACTORS INFLUENCING PERCEPTIONS OF CLASSROOM BEHAVIOUR

Ofsted (2014) documented teachers', learners' and parents' perceptions of the impact of low-level disruptive behaviour in English classrooms. Ofsted found that many school leaders, especially in secondary schools, are not majorly concerned about learners' low-level disruptive behaviour and its influence on their scholastic performance. In addition, the study found that many teachers have come to accept some low-level behavioural disruptions as part of everyday life in the classroom (Ofsted, 2014). The study concluded that the differences in perceptions of classroom behaviour among the stakeholders create inconsistency in applying behaviour monitoring policies, which annoy learners and their parents (Ofsted, 2014). In South Africa there are more reasons that account for varied school managers', teachers' and learners' perceptions of classroom behaviour (Alexander, 2011). In the following sections some of the views on classroom behaviour are explored.

### 2.3.1 Learners' behaviour as a derivative of cultural differences

South Africa is known as a rainbow nation because of the diversity in culture and languages. While this is viewed as a unique heritage of the country, it does evoke different views and perceptions of what should be considered ideal learners' behaviour in the classrooms. In this context one may ask: What kinds of actions should generally be considered behaviourally acceptable? This question becomes

even more important in a society that is largely multi-culturally grounded such as South Africa. On one hand, Rudwick (2008) observed that most people of European origin find it disrespectful if their conversational partner does not establish eye contact. On the other hand, for many traditionally raised Zulu-speaking people it may be considered disrespectful for children to look an older person in the eye during a conversation (see Rudwick, 2008; Alexander, 2011). Similar controversial means of showing respect were mentioned by De Kadt (1995), who noted that isiZulu[9]-speaking learners not only avoid establishing eye contact, but also sit down without asking for permission, which may be perceived as disrespectful from a Western perspective. The reason behind the student sitting down with permission lies in discomfort with someone who is 'superior' in status, but is physically lower down. So, while to sit down before being offered a seat may be perceived as rude and disrespectful among white individuals in South Africa, a Zulu learner may perceive it as disrespectful to remain standing (De Kadt, 1995).

Differences in cultural views of the acceptability of certain behavioural formations may influence ways in which learners and teachers view and react to some learners' classroom disruptions. This dilemma may generate hesitation on the part of classroom practitioners to address certain misbehaviours with the fear that they might be undermining other people's cultures. Other factors may be related to teachers' and learners' community values and upbringing. Triandis, Bontempo and Villareal (1988, p. 506) noted teachers and learners who live in rural context with low mobility fit into their communities and tend to be more collectivistic than those in urban context. Triandis *et al*. (1988) stated that teachers' views of learners' behaviour can be influenced by their upbringing from an individualist or a collectivist perspective. Depending on whether a teacher has an individualist[10] perspective or a collectivist[11] one, cultural differences may cause him or her to judge learners from other cultural backgrounds inaccurately as poorly behaved or disrespectful.

9. Isi-Zulu is a language spoken by the Zulu clan in South Africa. The Zulu clan is the largest, with more than 21% of South African population.

10. Individualism is defined by Triandis and Gelfand, (2012) as a belief and practice that promotes the uniqueness and self-reliance of an individual. Children who are raised by the community with individualism perspective place more emphasis of self-independence within the family circle. This is the spirit that promotes the view that close family members are responsible to correct their own children misbehaviour.

11. Collectivism as the opposite of individualism emphasises that people should prioritize the good of society over the welfare of an individual. In a collectivist system power is in the hands of the people in the community as a whole, not in the hands of a few powerful individuals. In a collectivist society,

### 2.3.2 Learners' behaviour shaped by the past political landscape

It is stated in Section 1.4 that South Africa experienced a past characterized by political tension and racial discrimination, which may still influence how learners behave in schools. This past, which was based largely on racial segregation, could also shape perceptions of what is considered acceptable or unacceptable in learners' classroom behaviour. It seems that after the eradication of the apartheid regime, learners' perceptions of good classroom behaviour have been influenced by an overemphasis on learners' rights (see Section 1.4; Section 1.5).

## 2.4 MANAGING LEARNERS' MISBEHAVIOUR IN SOUTH AFRICAN SCHOOLS

The South African Schools Act, No. 84 of 1996 (SASA, 1996) provides a useful framework to explain what should be considered good behaviour and bad behaviour of learners in South African schools. The Department of Basic Education (DBE) provides guidelines on learner behaviour in school and prescribes the disciplinary procedures to be followed by schools in the wake of transgressions by learners (DBE, 2008). SASA (1996) provides for the following guidelines.

### 2.4.1 Grade 1 offences

In terms of DBE, Grade 1 offences are considered less serious and could be dealt with by the staff member (for example the teacher), the representative council of learners (RCL) or the school prefect concerned. At this level learners' misconduct or misbehaviour could include leaving academic books or work material at home; not doing homework or not doing it on time; arriving late for class; displaying uncooperative behaviour, discourteous behaviour, insolence, temper tantrums, foul language, eating and chewing in class, defacing classroom property with graffiti, using personal electronic gadgets in the classroom, and disregarding the school dress code (SASA, 1996).

### 2.4.2 Grade 2 offences

Grade 2 offences are considered more serious than Grade 1 offences and are usually referred to the grade head. The grade head and the teacher concerned should arrange an interview session with the offender or issue a warning letter and

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decisions benefit all the people and a child belong to the community; hence any member of the community has the power and the responsibility to correct any unbecoming behaviour of a child who belongs to the same community (Triandis *et al.*, 1988).

communicate with the parent or guardian of the learner (offender). At this level, Grade 2 offences include cheating, stealing, defiance, being uncooperative in the classroom, frustrating the teaching and learning process in the classroom, fighting, gambling, smoking, lying, forging a parent's or guardian's signature, truancy (bunking lessons), vandalism and verbal abuse. Also, when a learner continues to disregard Grade 1 offences, repeated defiant behaviour would be considered a Grade 2 offence (SASA, 1996).

### 2.4.3 Grade 3 offences

All Grade 3 offences are referred immediately to the grade head, who in turn would refer the matter to the disciplinary committee for a disciplinary or tribunal hearing. The parents or guardian of the offender are advised in writing that a tribunal hearing has been convened. Grade 3 offences may include on-going disruptive behaviour in the classroom; intimidation; drug consumption; being in possession or under the influence of alcohol; public indecency; sexual harassment of the teacher or fellow learners; assaults on teachers or fellow learners; and racism (SASA, 1996).

### 2.4.4 Grade 4 offences

Grade 4 offences are of a serious nature to the extent that these are referred immediately to the school principal who could instantly file the report with South African Police Services (SAPS) and convene a disciplinary hearing. Learners' parents are always notified before disciplinary hearings can take place. Grade 4 offences include dealing with drugs and other illegal substances in school; hostage taking; sexual assault or rape; fraud (financial) and malicious damage to property (SASA, 1996).

The main purpose of the guidelines is to assist in creating safe schools (DBE, 2008). They also provide a framework for designing an inclusive and effective learners' code of conduct for South African schools in general. While this will assist in curbing some learners' offences at school, the DBE (2008) guidelines have limitations in that they do not outline or address learners' disruptive behaviour or lack of concentration that is prevalent in the classrooms, in particular during mathematics lessons.

## 2.5 TYPES OF LEARNERS' MISBEHAVIOUR IN MATHEMATICS CLASSROOMS

Jones and his associates conducted thousands of careful observations in hundreds of secondary schools in the USA (Charles, 1985). Their focus was on the classroom setting, on how teachers keep learners working on task, and how they deal with misbehaviour (Charles, 1985). Charles (1985) found that time wasted by learners during the lesson could be accounted for as follows: 80% was caused almost entirely by learners talking; 19% was wasted because learners were not interested in doing classwork; learners were leaving their seats without permission; or learners were simply day-dreaming. In some unruly classes the disruptions averaged 2.5 learners per minute (Charles, 1985). As teachers attempted to deal with these forms of misbehaviour, they lost almost 50% of the time needed for teaching and learning (Charles, 1985). Ofsted (2014) investigated low-level disruption in the classrooms in England. Table 2.2 shows some types of learners' misbehaviour that were identified through the teachers' perceptions in the Ofsted (2014) study.

***Table 2.2: Types of learners' disruptive behaviour identified by teachers***

| Type of disruption behaviour | % of teachers who reported |
|---|---|
| Talking and chatting | 69 |
| Disturbing other children | 38 |
| Calling out during the lesson | 35 |
| Not getting on with the work in the class | 31 |
| Fidgeting or fiddling with equipment | 23 |
| Purposely making noise to gain attention | 19 |
| Answering back or questioning instructions | 19 |
| Using mobile devices during lesson | 11 |
| Swinging chairs during lesson | 11 |

Similar observations were made in South Africa (Serame, 2013). Serame noted that learners' lack of concentration and boredom are the most prevalent misbehaviours in classrooms in South African rural schools, causing great concern to teachers. The above-mentioned studies did not focus solely on learners' behaviour inside the mathematics classrooms. However, they are important because they narrow the study, pinpointing types of inappropriate behaviour that need empirical investigation

during mathematics lessons. While this study investigated some aspects of learners' antisocial behaviour, its focus was related to learners' disruptive and off-task behaviour in the mathematics classroom.

## 2.6 INFLUENCE OF MISBEHAVIOUR ON MATHEMATICS INSTRUCTION

Some studies have drawn from learning theories and used models to explain learners' observed misbehaviour and its influence on mathematics instruction (see Section 1.10.2; Section 2.2). In the sections that follow, some of these perspectives are used to account for learners' behaviour in the mathematics classrooms. These perspectives are further used to illustrate the influence of misbehaviour on learners' performance in mathematics.

### 2.6.1 Primacy and recency effects

Primacy and recency effects refer to the notion that *what is learned first and last is remembered most* (Lane, 2010). Salvin (2009) says that primacy and recency effects are the oldest findings in educational psychology. The psychological effect of primacy and recency emphasizes that when learners are given a list of words to learn and then are tested afterwards, they tend to learn the first and last items of information much better than the information in the middle of the list. In terms of behaviour and scholastic performance one is able to see that primacy and recency effects may be limited when learners arrive late or sporadically to attend a mathematics lesson.

### 2.6.2 Memory and retention model

Cognitive psychology emphasizes the stages of acquiring and processing information in order to generate own knowledge. According to Woolfork (2013, p. 228), the first level process of information in learning mathematics is "sensory memory" or "sensory register". During this first phase the senses pay attention to and register selected stimuli while ignoring others (Schunk, 2008). Woolfork (2013) noted that the human brain is selective in paying attention and this is affected by other factors that are happening concurrently. Therefore divided attention caused by learners' negative behaviour could be the first stumbling block in learning mathematics.

The second cognitive process in learning mathematics is stated by Salvin (2009) as the brain ability to store information in the short-term memory. Woolfork (2013) stated that the capacity of short-term memory is limited, and is able to hold five to nine items of information at a time for 15 to 20 seconds. Information that is learned well is sent for permanent storage in long-term memory. Information that is not processed in the short duration of working memory is discarded, making space available for processing new information. The implication of learners' negative behaviour on working memory is that it overloads the limited space of the working memory and reduces the attention span (Schenck, 2011).

The last step in memory processing and learning mathematics involves remembering teachers' instructions, formulas, procedural operations and theorems. However, according to Schenck (2011), learners' forgetfulness is an everyday occurrence in mathematics lessons. Salvin (2009) noted that one important reason that learners forget is interference, which happens when information is mixed up with or instantly pushed aside by other information. The reason for this forgetfulness is that interference inhibits learners from absorbing the information by rehearsing it mentally and establishing it in their working memories (Salvin, 2009).

### 2.6.3 Effects of behaviour on academic learning time

Time on task or academic learning time (ALT) is defined as "the amount of time learners spend in actively engaging in the activities that promote learning" (Squires, Huitt & Segars, 1983, p. 43). Carroll (1963) defined time spent as function, which results from opportunity and perseverance. Carroll's model definition of ALT means that "preparedness by the learner for understanding the material to be learned, coupled with the quality engagement time, and quality instructions promote quality school learning" (Carroll, 1963, p. 187). This definition highlights two aspects of learners' behaviour that may hinder learners' performance, namely self-discipline (mental preparedness a learner) and time that is wasted when learners' disruptive behaviour characterizes mathematics lessons. The time-on-task effect states that "the amount of time one sets aside to study positively correlates with the knowledge acquired" (Goodman, 1990, p.13).

Charles (1985) encourages the time-on-task method of learning and teaching, which means that at a designated time learners should be doing what they are supposed to

do. Charles observed that learners who are not on task start day-dreaming, doodling, wandering, or bothering their fellow learners. In contrast, learners who are on task seldom misbehave and do not waste time disrupting other learners or adding the stress to the teacher (Charles, 1985). Similarly, Malone, Bonitz and Ricket (1998) stated that time plays an important role in the teaching and learning of mathematics. When time dedicated to the teaching and learning of mathematics is lost owing to maintaining and administering discipline, mathematics teachers have to rush through the syllabus or leave out certain topics altogether. This affects well-behaved learners negatively, who lose out on quality education. Goodman (1990) observed that some teachers tolerate more behavioural interruptions when working with lower-performing learners than with higher-achieving learners.

The current study sought to investigate how Grade 10 mathematics teachers in South African schools perceive different types of misbehaviour and whether they manifested the habit of turning a blind eye to the misbehaviour of poorly performing learners. If this is the norm in South African schools it could be one way to account for the enormous gap between learners who pass and those who fail mathematics in the same class. Researchers are discovering that the quality (not quantity) of time spent in doing homework, coupled with learners' efforts while doing it, "generates a better performance" (Goodman, 1990, p. 13). Another better way of spending time on task is doing homework (Woolfork, 2013). Recent evidence has shown that "learners in high school who do more homework and watch less television after school perform better than those who do the opposite" (Woolfork, 2013, p. 525). In South Africa, homework is viewed as an essential component of education, especially mathematics; and failure to do homework is regarded as misbehaving (DBE, 2008; SASA, 1996) (see Section 2.4.1).

## 2.7. DEVELOPING A CONCEPTUAL FRAMEWORK FOR THE STUDY

Atkins (2012) defines a conceptual framework as "a theory or a set of understandings of how the world works" (p. 81). In research, empirical work and data analyses should be related to the framework of understandings and ideas reflected in the literature. Atkins (2012) adds that the conceptual framework places the study in its setting and may also outline the scope of the study. The conceptual framework of this study was based on the teaching and learning model developed by Huitt (1997) (see Figure 2.2). In developing this conceptual framework, Huitt (1997)

adopted the terminology and ideology from Carroll's (1963) model of classroom learning (ALT) (see Section 2.6.3; see also Huitt, 1997). This model was adopted in the current study for the following reason together (Figure 2.2):

- It highlights the interplay between a host of variables that are considered to eventually influence learners' performance.

The variables in Figure 2.2 range from a relatively larger global context to as little as students' behaviour inside the classroom. The two variables: those that shape teachers' characteristics (Section 2.3.1) and those that shape learners' characteristics (Section 2.2.2) negatively impact on mathematics learning conditions in South African schools. Figure 2.2 highlights the influence of a multitude of contextual variables that play themselves out at different levels to influence learners' characteristics, and eventually learners' scholastic performance. The outer layer presents out-of-school factors such as the influence of: (i) family background; (ii) interactions with the community; (iii) state policies; (iv) peer associations; and, (v) religious affiliations. The next inner layer emphasizes that learners' characteristics at school are shaped by the influence of factors (variables) in the outer layer. School characteristics, which are reflected in a square-shaped layer in Figure 2.2, may play an influential role in determining the classroom behaviour of both teachers and learners.

The context of the study in Section 1.4 presented the historical background of South African types of regimes. For instance, the apartheid regime used its state policies to generate segregation-conscious laws that undermined the educational goals of one race over the other. The context of segregated education gave rise to certain types of behavioural patterns that eventually shaped learners' attitudes and performance in mathematics classrooms. School characteristics in Figure 2.2 could be linked to the extent to which a school implements a set of DBE school policies to regulate learners' classroom behaviour (see Section 2.4). A school that is not implementing its behaviour-monitoring policies optimally stands to perpetuate the degeneration of behaviour in its learners (see Section 1.10.3). Therefore in terms of Figure 2.2, school processes, which could be seen to come into play when the provisions of SASA (1996) are well articulated, may determine the types of behavioural patterns that learners are more likely to exhibit in the classroom.

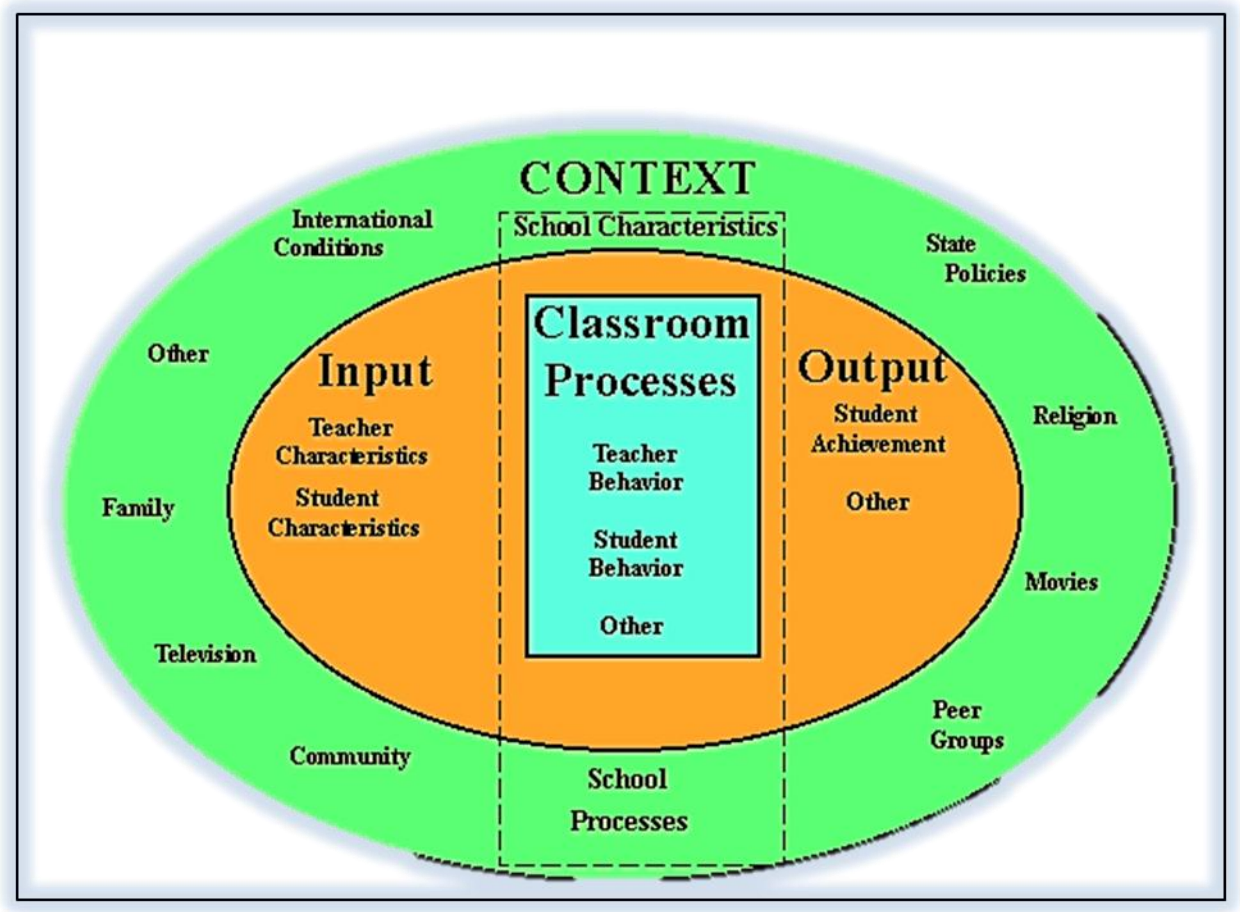



***Figure 2.2**: **Huitt's model to illustrate the influence of behaviour on performance***
***Source:** Huitt (1997)*

## 2.8 SUMMARY OF THE CHAPTER

The literature reviewed in this chapter highlighted the significance of cultivating learners' positive behaviour during mathematics lessons as the opposite may adversely influence learners' performance and teachers' morale. The literature review acknowledged that learners' prevailing lack of good behaviour in South African schools could be traced to an apartheid system that denied decent educational opportunities to black communities. The literature noted the efforts by the South African education and various local researchers to improve learners' performance in mathematics. However, such efforts are limited by the low level of learners' behaviour in schools. The literature suggested a correlation between factors that cause learners' negative behaviour in the classroom and those that influence poor performance in mathematics classrooms. This review suggests a need for a scientific inquiry to explore the link between learners' behavioural patterns during mathematics and their performance in mathematics.

# CHAPTER THREE

# RESEARCH METHODOLOGY

## 3.1 INTRODUCTION

This chapter presents the research methodology and the methods used for data collection and analysis. These issues are addressed: the research design of the study; the population and sampling techniques employed in the study; instrumentation; issues of reliability and validity; techniques used in the study for data collection and analysis; and a discussion of ethical considerations.

## 3.2 RESEARCH DESIGN

A research design is “a detailed plan for collecting and analysing data to try to answer a research question” (Salvin, 2007, p. 9). The current study adopted a qualitative approach to collect and analyse data in order to answer the research questions (Section 1.6). The phenomenology design of a qualitative approach was used in this study. The philosopher Edmund Husserl (1859-1938) who is the founder of phenomenology believed that the experiences of individuals at any moment in time are “an indication of their real world” (Johnson & Christensen 2012, p. 395). According to Savin-Baden and Major (2013), phenomenology is a research approach that attempts to uncover “what several participants who experience a phenomenon have in common” (Savin-Baden & Major 2013, p.114). According to Johnson and Christensen (2012, p. 397), phenomenologists generally assume that there is some commonality in human experience and they seek to understand this commonality, hence they seek to interpret and understand human experience as experienced by the participants.

In the context of the current study the phenomenology design enabled the researcher to gain understanding of how Grade 10 learners experienced the learning of mathematics in a classroom environment that is characterized by learners’ problematic behaviour. The qualitative survey component involved using questionnaire to collect data in order to determine participants’ opinions about learners’ classroom behaviour (Section 1.2). The descriptive component helped the

researcher to probe the views of participants on the identified forms of classroom behaviour and their impact on mathematical performance (Section 1.1; Section 1.2). According to Mertler (2011), the descriptive component of the survey research design helps the researcher to document a descriptive narrative to account for the observed characteristics of a situation or phenomenon. Using this approach the current study collected data to describe and account for learners' behaviour in Grade 10 mathematics classrooms. According to Johnson and Christensen (2012, p. 217), descriptive survey is "a non-experimental research method which gathers information to understand the characteristics of the population based on the sampled data".

## 3.3 POPULATION OF THE STUDY

A population refers to all members of a clearly described group of people with the potential to be the focus of an investigation (Drew *et al*., 2008). The population of the current study consisted of all Grade 10 secondary school mathematics learners (n=512), all Grade 10 mathematics teachers (n=12), and all HODs for mathematics (n=7) in Johannesburg East District Far East Cluster, also known as D9. D9 consists of seven public secondary schools. The list of all secondary schools in D9 was obtained from the district and this was considered a sampling frame for the current study.

### 3.3.1 Sampling procedures

#### *3.3.1.1 Sampling of schools*

Two schools were selected for participation in the study. Of the two selected schools, one was a well-performing school (WPS) and the other was a poorly performing school (PPS). The purpose of this combination was to consider different contexts for the investigation as the researcher thought that schools emerging from varying contextual backgrounds could project different types of classroom behaviour for mathematics instruction. Purposive sampling was used to select schools. Gay, Mills and Airasian (2003) noted that in purposive sampling the researcher "uses prior knowledge to identify criteria to select a sample based on his or her experience of the groups to be sampled" (p. 115).

In sampling 2 out of 7 secondary schools from D9, the researcher used the Annual National Assessment (ANA) results of Grade 9 mathematics for the years 2012 and 2013. The two sampled schools were classified as either performing well or performing poorly (see Section 1.10.4; see also Section 1.10.5; Table 3.4). The classification was facilitated in the following manner: ANA results were essential because the majority of learners who wrote this examination in 2013 eventually participated in the current study. Subsequent to this classification four schools were designated poor performers, while three schools were designated good performers. The schools that eventually participated were selected from the two groups (performing well and performing badly) and only one school from each group was sampled.

To select one school from each group simple random sampling procedures were employed. According to Martens (2010), random sampling means that "each member of the population has an equal and independent chance of been selected" (p. 318). The researcher wrote individual names of schools on identical slips and two hats were used to represent each performance classification. All four poorly performing schools were put in one hat, and so was the placing of well-performing schools. The two hats were shaken and a slip, which represented a school, was selected arbitrarily from each hat. The selected schools from each performance category eventually participated in the study.

#### *3.3.1.2 The sample of the study*

The participants of the study were sampled as follow: i) the researcher requested all learners' test marks from January 2014 to June 2014 for all Grade 10 mathematics classes in each school (WPS & PPS) (see Section 1.1); and ii) the researcher calculated the average mathematics marks per class and identified prospective study participants from both schools. From this process 54 learners from WPS were designated good performers; and 51 from PPS were designated poor performers. Subsequently a random sampling procedure was used to select 5 learners who participated in the interviews (see Section 3.3.1.1). Random selection ensured that the 5 learners represented a pool (population) of learners in both schools.

Grade 10 mathematics teachers and mathematics Heads of Department (HODs) in the two participating schools were also conveniently requested to participate in the

study. This form of sampling resembled a convenience sampling procedure in which participants who are available are requested to participate. Both teachers and both HODs from the two schools agreed to participate. Figure 3.1 provides a summary of the entire sampling procedures that characterized the current study. The numbers 54 in WPS and 51 in PPS refer only to the population of Grade 10 learners in each school from which 5 interview participants were sampled in each school.

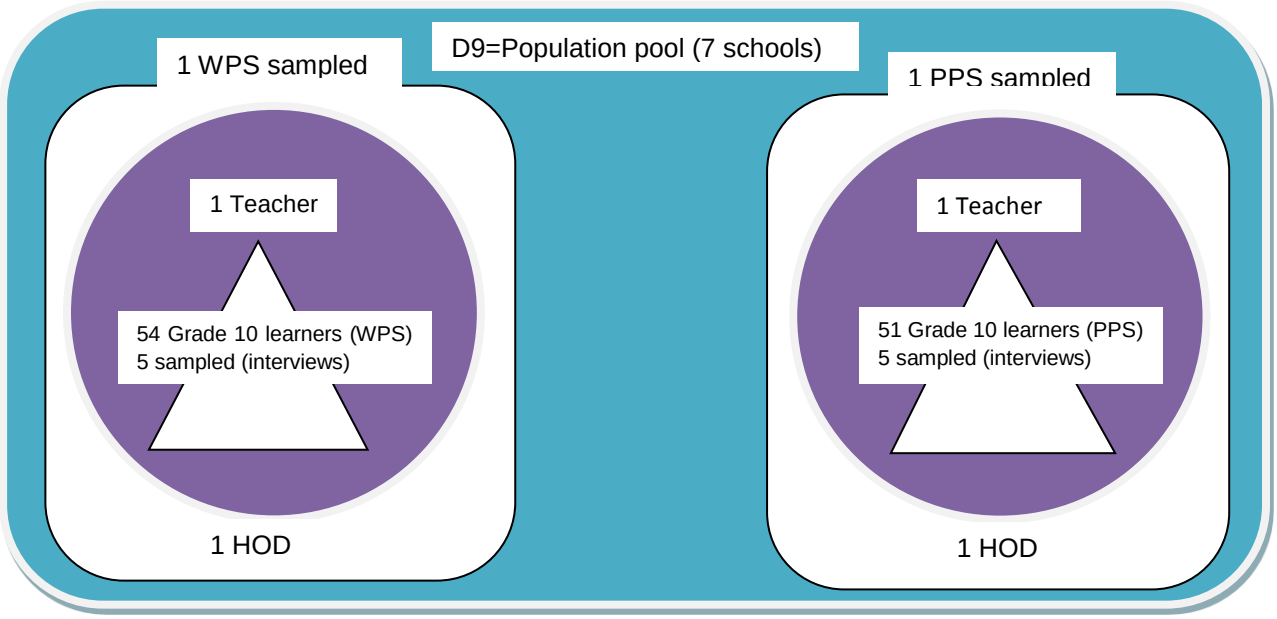



***Figure 3.1: Summary of the sampling procedures for the current study***

## 3.4 INSTRUMENTATION

Instruments in educational research could be tests or other tools used to collect data (Gay *et al*., 2006). The current study used three instruments for data collection: (i) document analysis of learners' assessment marks that were accumulated between January 2014 and June 2014 (see Appendix C; see also Section 1.3.3); ii) questionnaire administration for the teachers (n=2) and HODs (n=2) (see Appendix B); and iii) semi-structured interviews for learners (n=10) from both schools (WPS and PPS) (see Appendix A). According to Merriam (2009), the use of three instruments placed the study in a triangulation design.

### 3.4.1 Purposes of data collection instruments

The purposes of data collection instruments are outlined in Table 3.1.

### 3.4.2 Development of instruments

To compile a list of learners' classroom behaviour to be investigated using the teachers' and HODs' questionnaires the study adopted the Algozzine 2012 DBC (disruptive behaviour checklist) (Algozzine, 2012). Algozzine 2012 DBC provides a list of well-researched general types of classroom misbehaviour manifested by learners during instruction. The Algozzine 2012 DBC is a validated instrument; however in the context of the study a further content validity was assured (See section 3.4.3.2). From Algozzine 2012 DBC the study used learners' inappropriate classroom behaviour related to disruption, lack of attentiveness and disobedience. Other types of classroom behaviour were adopted from DBE (2008), which serves as a guideline to manage learners' misbehaviour in South African schools (see Section 2.4). These sources assisted the researcher to construct items for the questionnaires and interviews.

***Table 3.1: Summary of the purpose of data collection instruments***

| INSTRUMENT TYPE | PURPOSE OF INSTRUMENT |
|---|---|
| Document analysis | To facilitate the interpretation of learners' on-going school assessments in mathematics for six months |
| Teacher/ HOD questionnaires | Documentation of teachers' perception on types of learners' behaviour in mathematics classroom |
| Learners' interviews | • To document learners' views on the types of learners' behaviour in mathematics classroom<br>• To document learners' views on factors that influences their performance in mathematics |

#### *3.4.2.1 Document analysis*

Sheri (2012) describes document analysis as "artefacts in the form of documents made by schools or teachers to provide information on what students are expected to learn and how well they were performing" (Sheri 2012, p. 134). The document analysis tool was adopted from the Grade 10 mathematics working mark sheet in the Department of Basic Education (DBE) database (see Appendix C). The researcher adapted the tool to capture learners' marks for later interpretation.

***Table 3.2: Summary of the contents of the questionnaires and their item focus***

| QUESTIONNAIRE | SECTION A | SECTION B | SECTION C |
|---|---|---|---|
| **Number of items** | 17 | 22 | 15 |
| **Type of items and focus** | • General behaviour of learners in school<br>• Structured<br>• Selecting appropriate option (Likert scale) | • Specific learner behaviour<br>• Structured<br>• Selecting appropriate option (Likert scale) | • Corrective measured<br>• Structured<br>• Selecting appropriate option (Likert scale) |
| **Respondents/ response type** | • Teachers/ HODs<br>• To indicate if the general school behaviour influenced learners' behaviour | • Teachers<br>• To respond on learners' behaviour during mathematics lesson | • Teachers<br>• To indicate type of behaviour pattern occurring during lesson and to what extent |
| **Purpose** | • To determine the influence of school behaviour, if any, on individual learners<br>• To determine the link between questionnaire responses and general performance of school | • To determine the influence of learner's behaviour, if any, on mathematics performance | • To determine the effectiveness of corrective methods/ classroom management strategies employed by teachers |
| **Research question (RQ)** | RQ 1.7.2 | RQ 1.7.2 | RQ 1.7.3 |

### *3.4.2.2 Teachers' and HODs' questionnaire*

Teachers' and HODs' questionnaires were all developed by the researcher. This was because none of the existing data collection instruments adequately addressed aspects of learner behaviour that were prevalent in the D9 district where the study was conducted. For instance, at the time of conducting this study, South African schools were characterized by youthful gangsters such as the group called *Izikhothane.*[12] These are often local groups with minimal international recognition and exposure. The researcher found that all items on the questionnaires had been answered. Each questionnaire consisted of Likert scale-type items with the following ratings: *4=Most of the time*; *3=Sometimes*; *2=Rare*; and *1=Never*. Table 3.2 summarizes the development of questionnaires (see also Appendix B).

12. *Izikhothane* are known locally to be groups of youngsters, mostly school-going children, with gangsterism tendencies. They usually possess the following characteristics: (i) they do not like school; and, (ii) they ask money from their low-income parents (sometime under the pretence that they will commit suicide if their request is not acceded to) to squander it by buying expensive clothing and gadgets to impress their peers.

#### *3.4.2.3 Learners' interview schedule*

Another data collection instrument used to determine the impact of Grade 10 learners' behaviour on their academic performance in mathematics was the learner interview schedule. According to Gay *et al*. (2003, p. 209), an interview is "a purposeful interaction between two or more people, with an objective of getting information from one person using probing questions". This type of instrument gathers more in-depth data about people's experiences, feelings and attitudes more easily than using observation, Generally learners' interviews aimed to explore the views of Grade 10 learners on factors relating to their behaviour and performance during mathematics lessons (see Table 3.3 for a summary). Items included in the interview schedules were constructed in line with the research questions of the study (Section 1.7). All items in the interview schedule were developed by the researcher.

### 3.4.3 Determining the measurement qualities of data collection instruments

Qualities of instruments were measured in term of validly and reliability.

#### *3.4.3.1 Testing the validity of learners' recorded marks*

Springer (2010, p. 158) states that "validity is the extent to which a test measures the construct it is intended to measure". It was verified with teachers of participating schools that learners' marks that were used for document analysis emanated from the assessment tasks that had been constructed in consideration of the promotion and progression requirements for Grade 10 mathematics that are captured in Table 3.4 (DBE, 2010). Learners' recorded marks were considered valid and reliable because the researcher established that all assessment tasks in both schools were moderated by subject HODs and that all tasks had been constructed in line with the DBE assessment guidelines (DBE, 2010).

#### *3.4.3.2 Validity of questionnaires*

Items related to learners' behaviour were corroborated by Algozzine 2012 DBC validity (see Section 3.5.2). Other items were validated using the provisions of the South African School Act on misbehaviour management (see Section 2.4; SASA, 1996). In addition, the questionnaire items were given to two mathematics teachers who did not participate in the study for verification. Two teachers were also requested to include extra items that they felt would relate to learners' performance and behaviour in mathematics. Each questionnaire was given to another

mathematics education expert for further input and adjustments. This process ensured that each questionnaire would measure what it purported to measure.

***Table 3.3: Summary of the construction of learners' interview schedule***

| QUESTIONNAIRE | SECTION 1 | SECTION 2 | SECTION 3 |
|---|---|---|---|
| **Items** | 1-11 | 12-25 | 26-33 |
| **Type of items and focus** | • Open-ended<br>• Structured<br>• Determining learners' views of mathematics | • Open-ended<br>• Structured questions<br>• To determine types of behaviour learners display during mathematics instruction | • Closed-ended<br>• Structured questions<br>• To determine types of behaviour learners are responsible for in mathematics classroom |
| **Respondents/ response type** | • Learners<br>• To respond on classroom factors influencing their maths performance | • Learners<br>• To narrate types of learners' negative behaviour encountered during maths lesson | • Learners<br>• To reveal learner's own behaviour that they find difficult to control during mathematics lessons |
| **Purpose** | To determine factors that influence learners' performance in mathematics | To determine predominant behavioural patterns in mathematics classroom | To determine if there is a link between learners' behaviour and their maths performance |
| **Related research question (RQ)** | RQ 1.7.4 | RQ 1.7.1 | RQ 1.7.3 |

***Table 3.4: Achievement levels that describe learners' performance in Grades 10–12***

| ACHIEVEMENT LEVEL | ACHIEVEMENT DESCRIPTION | MARKS % |
|---|---|---|
| 7 | Outstanding | 80–100 |
| 6 | Meritorious | 70–79 |
| 5 | Substantial | 60–69 |
| 4 | Adequate | 50–59 |
| 3 | Moderate | 40–49 |
| 2 | Elementary | 30–39 |
| 1 | Not achieved | 0–29 |

### *3.4.3.3 Validity of the interview schedule*

Construct validity was used to assess the validity of interview schedule for learners. In this case items were tested on learners by asking them to mention types of classroom behaviour that they observed in previous grade levels. Their responses were compared with items that had already appeared in the interview schedule. In

addition, the interview schedule was given to an English teacher for editing and alignment with average Grade 10 learners. Other experts in the mathematics education field participated in the construction of the interview schedule.

### 3.4.4 Reliability

According to Johnson and Christensen (2012), an instrument is reliable if it "maintains stability of measurement or consistency after administering the same test in a number of attempts" (p.138).

#### *3.4.4.1 Testing the reliability of a questionnaire*

This study measured the internal consistency of each questionnaire using Cronbach's alpha coefficient (Cronbach, 1951). McMillan (2012) recommends the use of this measurement procedure when a questionnaire contains a range of possible answers for each item that constitute the scoring measure such as the Likert scale. Johnson and Christensen (2012) say that a reliability of $r$=0 stands for no reliability while $r$=+1.00 stands for maximum reliability.

#### *3.4.4.2 Testing the reliability of interview schedule*

The researcher piloted the interview questions on two Grade 10 mathematics learners who possessed similar characteristics to the learners in the participating schools. To maximize the reliability of the interview schedule, all interviews were conducted by the researcher under conditions that were similar in both schools. All interviews were conducted in learners' own schools between 14:00 and 15:30. For uniformity the researcher asked all interview items using the schedule (Appendix A). All interviews were audio recorded.

## 3.5 DATA COLLECTION PHASES

Data were collected in three phases for the current study.

### 3.5.1 Phase one

The first phase consisted of collecting data from Grade 10 learners' working mark sheet accumulated over a six-month period (see Appendix C). Learners' mark sheets were accessed through the mathematics HOD via the principal of the school. These data provided insight into the learners' performance over the set period.

### 3.5.2 Phase two

The second phase collected data from the mathematics HOD and teachers through the questionnaires (see Appendix B). The questionnaires were administered in a week. The researcher allowed all respondents almost three weeks to complete and return the questionnaire. The researcher went to schools to collect all questionnaires and the return rate was 100%.

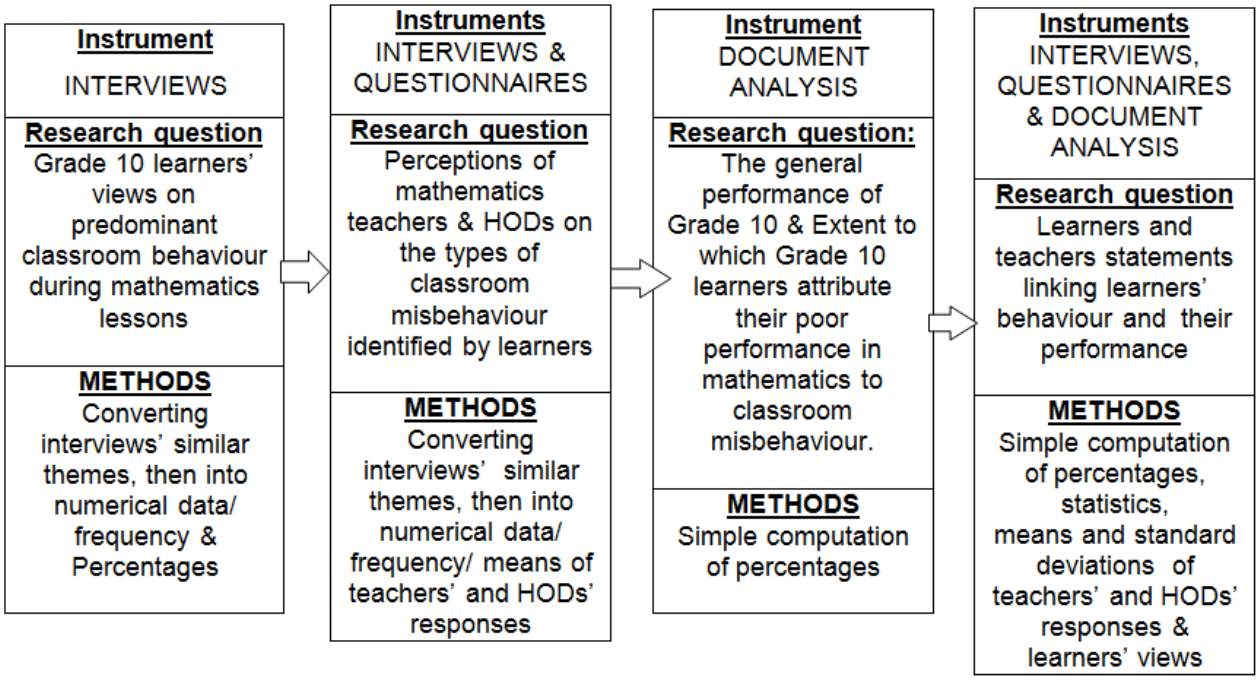
### 3.5.3 Phase three

The third phase was to conduct learners' interviews to gain insight into learners' personal behaviour in mathematics classroom and to identify learners' problematic behaviour that contributed more to poor performance in mathematics. Interviews took place between 14:00 and 15:30 (see Appendix A, see also Section 3.5.4.2). This arrangement was meant to ensure that research activities would not stand in the way of teaching and learning. All interviews were audio recorded to ensure that all aspects of the conversation were well documented (Section 3.5.4.2).

## 3.6 DATA ANALYSIS PROCEDURES

This section presents the methods and procedures that were followed in data analysis to answer all research questions of the study (see Figure 3.2; Section 1.7)

***Figure 3.2: Diagrammatical summary of data analysis procedures for this study***



### 3.6.1 Converting narrative data into numerical data

The study investigated aspects of learners' behaviour in the classroom. Learners' behaviour is not quantifiable, nor can it be measured scientifically. It can be studied through experience, artefacts and interactions with learners and teachers. Data of human experience, which in this case represented learners' behaviour, were collected and analysed with ethnomethodology procedures. According to Martens (2010), in ethnomethodology analysis, "the researcher's job is to discover the meaning of the world as it is experienced by the individual" (p. 235). In using ethnomethodology to analyse learners' interviews the following procedures were considered:

- Data were collected from learners through the interviews and were audio-recorded (see Section 3.5; Section 3.6.3);
- Learners' interview responses were transcribed verbatim;
- Transcribed interviews were organised in terms of similar themes and categories, and were coded;
- The frequencies of similar themes, codes and categories were counted and recorded in the check list matrix. Merriam (2009) explains a matrix as a chart used to condense qualitative data into simple categories and provide a multidimensional summary that will facilitate more intense analysis. The total scores of learners in each school were compiled and classified in a frequency table (see Appendix E); and,
- Relative frequency of similar factors and types of misbehaviour was compared using simple percentage statistics.

The interviews were conducted, transcribed, categorised and coded manually by the researcher. This allowed the researcher to become acquainted with the spirit behind the expressions of the interviewees. The interviews were analysed using SPSS to ensure that there were no human errors in the findings. This procedure was used to answer the first and second research question (see Section 1.7.3)

### 3.6.2 Analysis of teacher and head of department questionnaire responses

Data generated from the teachers and HODs through the questionnaires were analysed using descriptive statistics to answer the second and third research

questions. The means (averages) of responses were computed to determine the extent to which a particular type of learners' misbehaviour was mentioned and experienced by the teacher and HOD (see Table 3.5). Mean values and standard deviations were computed using values of participants' responses in terms of the Likert scale ratings in Table 3.5. In terms of Table 3.5, any mean ranging within the category *3.50-4.00* would indicate that teachers and HODs experienced a particular type of learner misbehaviour most of the time in their teaching. Descriptive statistics was used to determine relative frequency and simple percentage in answering most of the research questions.

***Table 3.5: Likert scale ratings and interpretation of the scale values***

| Response categories | Value | Scope of values |
|---|---|---|
| Most of the time | 4 | 3.50–4.00 |
| Sometimes | 3 | 2.50–3.49 |
| Rarely | 2 | 1.50–2.49 |
| Never | 1 | 1.00–1.49 |

### 3.6.3 Analysis of learners' interviews

This study used narrative analysis methods to analyse learners' interviews that reflected on the types of behavioural types between the two schools. In narrative analysis McMillan (2012) states, "every detail that is recorded through interviews contributes to a better understanding of the topic under investigation" (p. 274). In addition, McMillan states that in narrative analysis "the researcher reports of what have been recorded in the same form on which it occurs naturally" McMillan (2012, p. 275). Learners' interviews generated types of behaviour learners encountered or observed in mathematics classrooms. In dealing with learners' responses the researcher ensured that abstracts from interviews were used in their original form, and were then synthesized and consolidated in answering the research question.

### 3.6.4 Participants' name codes used in the study

The researcher protected the identities of schools and those of participants (see Section 3.7). This arrangement was in line with the guidelines on ethical considerations in studies that involve human beings. Table 3.6 shows the codes that were used for participants in the study. For reporting purposes the letter "R" was

used to represent the “Researcher” and for other participants the codes in Table 3.6 were used.

For the sampling method that is described in Section 3.3.1.2 (sample of 10 learners from both schools) the researcher allocated name codes to all Grade 10 mathematics learners from both participating schools (see Appendix C under the column “No.”). Five learners who participated in the interview were from the two classes of 54 learners in WPS; and the other five learners were from the two mathematics classes PPS (see Figure 3.1). The following procedure was used to establish name codes for all learners in both schools:

1. WPS was allocated the letters “SA”, implying the first school, and PPS was allocated the letter “SB” implying the second school;
2. Each learner was allocated the letter “L”, which was shorthand for “learner”;
3. To distinguish one learner from the other learners they were arranged in the order from 1 to 54 in WPS, and 1 to 51 in PPS; and,
4. This meant that the first learner in WPS would be identified as L01SA, implying learner one (or first learner) from school one (or first school). In the same way, L39SB would mean that the learner was from PPS and was placed 39th in the list of names in that school.

This means that in WPS learners’ name codes ran from L01SA to L54SA. In PPS the name list ran from L01SB to L51SB. For analysis in the next sections the researcher used these codes when referring to learners’ responses in the interviews (for examples see Section 4.3.1.1). It should be remembered that only 5 learners from each school participated in the interviews. Interview respondents were sampled using a simple random sampling method (see Section 3.3.1.2; see also Figure 3.1). Table 3.6 provides the name codes of learners, teachers and HODs, all of whom participated in the study.

***Table 3.6: Code names for all participants in the study***

| School (n=2) | Learners (n=10) | Teachers (n=2) | HODs (n=2) |
|---|---|---|---|
| **WPS** | 1.L11SA | 1. TSA | 1. HDSA |
| | 2.L22SA | | |
| | 3.L29SA | | |
| | 4.L39SA | | |
| | 5.L50SA | | |
| | | | |
| **PPS** | 1. L10SB | 1. TSB | 1. HDSB |
| | 2. L20SB | | |
| | 3. L23SB | | |
| | 4. L37SB | | |
| | 5. L46SB | | |

## 3.7 ETHICAL CONSIDERATIONS

According to Johnson and Christensen (2012), ethics are principles and guidelines that help us to uphold the welfare of others. During the research, study ethical compliance should be observed by "upholding the values of the society, maintaining a professional conduct, most importantly in the fair treatment of research participants" (Johnson & Christensen, 2012, p. 99). Research protocol was observed by requesting and obtaining written permission to conduct the study from DBE (see Appendix K). All learners completed the assent forms signed by the parent or a guardian (see Appendix J).

The names of the schools and participants were not used in the study, and codes were used instead (see Section 4.2; Table 3.6). Participants were informed of the nature and the purpose of the study prior to taking part. Participation was voluntary and the right to withdraw at any stage of the research without penalty was assured to all participants. Issues of confidentiality and anonymity were explained to participants in the informed consent letters. It was ensured that research activities did not interfere with teaching and learning activities in all schools. All letters, together with the research proposal, were submitted for ethical clearance from the University of South Africa Ethics Committee (see Appendix L). Editing and adjustment were done and the approval to conduct the study was granted (see Appendix L).

## 3.8 SUMMARY OF THE CHAPTER

Chapter 4 presented the methodology that was used in collecting and analysing data to answer the main research question. The study followed a simple survey design.

The population and the sample of the study were described in Section 3.3. The chapter discussed all types of instruments used in the current study for data analysis purposes. The discussions on the instrumentation covered issues of instrument development, the purposes of each instrument and issues of reliability and validity (see Section 3.4). A summary of data collection phases and a brief discussion of the procedures followed to analyse the study data were all discussed in this chapter (see Section 3.5; Section 3.6). The ethical issues were also discussed in Section 3.7. The next chapter presents the analysis of data collected through the document analysis (Section 3.4.2.1), the teacher and HOD questionnaires (Section 3.4.2.2) and the interviews with learners (Section 3.4.2.3).

# CHAPTER FOUR

# FINDINGS

## 4.1 INTRODUCTION

The previous chapter discussed the methods and the instruments that were used in collecting data to answer the research questions of the study (see Section 1.6). These research questions are related to the main research question: *What impact does Grade 10 learners' behaviour have on their performance in mathematics in Johannesburg East District*? The study followed a phenomenology design of a qualitative approach by Edmund Husserl (1859-1938) (See Section 3.2). Data generated thought interviews were analysed using an ethno methodological method (see Section 3.7.1). Data generated thought record analysis and questionnaires were analysed using simple descriptive analysis; and the findings were presented in the forms of charts, tables, and graphic presentations.

## 4.2 LEARNERS' VIEWS ON MATHEMATICS-RELATED BEHAVIOUR

This study aimed to identify types of learners' classroom behaviour that are manifested during mathematics instruction (see Section 1.2). The process of achieving this aim entailed conducting interviews with learners, which tended to reveal a set of misbehaviours that learners exhibited during mathematics instruction (Section 3.4.2.3; Section 3.5.3. Each component of the interview session was audio recorded (see Section 3.4.4.2; Section 3.5.3). Learners were interviewed individually in their own schools. The researcher read the items from the interview schedule to maximize uniformity (Section 3.4.4.2). To facilitate the analysis of learners' interviews, the recoded data were first transcribed (see Appendix D). After transcription the researcher identified themes that seemed to relate to the aim of the study (Section 1.2; Appendix D). Identified themes were highlighted and classified in terms of similarity (see Appendix D), and categorized into three forms of learners' classroom behaviour, namely lack of concentration, disruptive behaviour and anti-social behaviour (Figure 4.1).

All forms of classroom behaviour were considered to take place during a mathematics instruction (see Section 1.10.3 for the explanation of types of classroom behaviour). Three main forms of learners' classroom behaviour were identified during analysis, namely disruptive behaviour, lack of concentration and anti-social behaviour (Section 1.10.3; see also Appendix E, Figure 4.1). The researcher noted the number of times interview participants mentioned a particular type of misbehaviour that had occurred during a mathematics lesson. The relative frequency was used to determine the percentage of occurrence for each behavioural type. Types of learners' documented classroom misbehaviour were grouped in three categories that related to the following themes: (i) lack of concentration (201 occurrences); (ii) disruptive behaviour (255 occurrences); and, (iii) antisocial behaviour (70 occurrences) (see Appendix D; Appendix E). This meant that disruptive behaviour was more dominant than the other two forms of misbehaviour (see Figure 4.1).

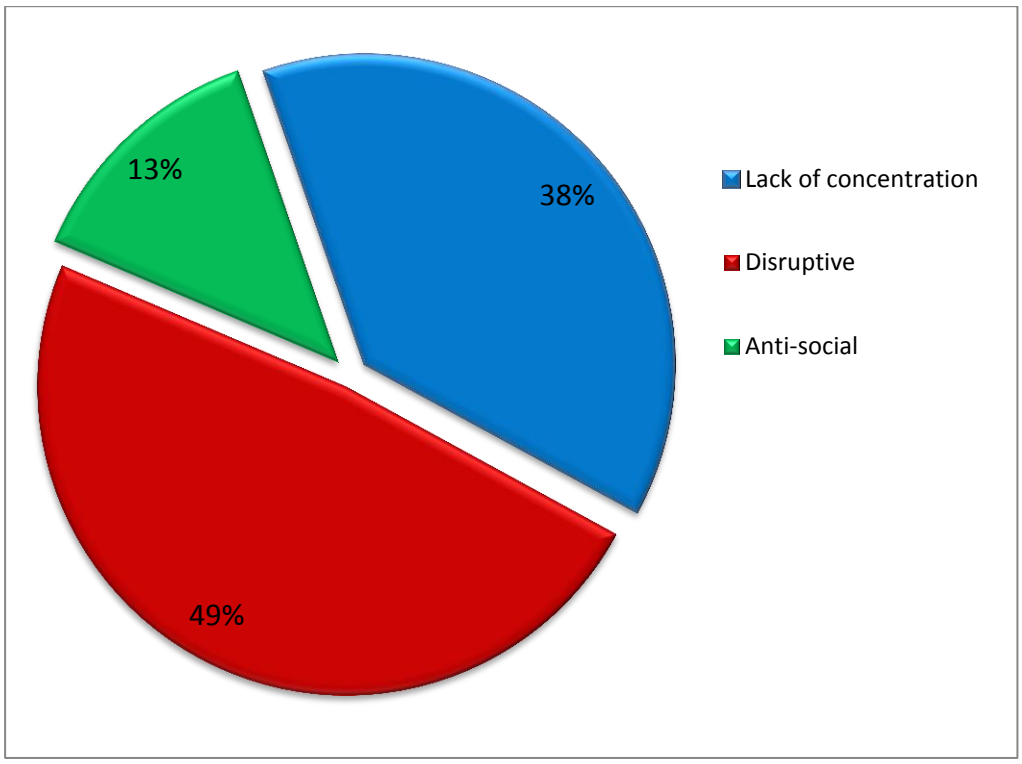



***Figure 4.1: Pie chart of three categories of learners' behaviour in both schools***

The types of misbehaviour in Figure 4.1 are discussed in the next sections.

### 4.2.1. Lack of concentration

Lack of concentration was mentioned by learners as prevalent misbehaviour in mathematics classrooms (Appendix D). Learners viewed this category of behaviour as a contributing factor to their failure in mathematics. Learners' lack of concentration and projecting off-task behaviour were mentioned and further classified into six types. The researcher recorded the number of times learners mentioned or repeated types of lack of concentration behaviour. These types of misbehaviour and their scores in brackets were laziness (93); sleeping in class (15); not doing homework or class work (34); bunking lessons (26); lateness (20); and absenteeism (13). In this study the forms of lack of concentration behaviour are those that contribute to inert of learning whether present in the class or absent in the class during mathematics instruction. Hence learners' behaviour relating to absenteeism, lateness, and bunking lessons were also classified in the lack of concentration category. Figure 4.2 shows a graphical representation of types of lack of concentration and percentages.

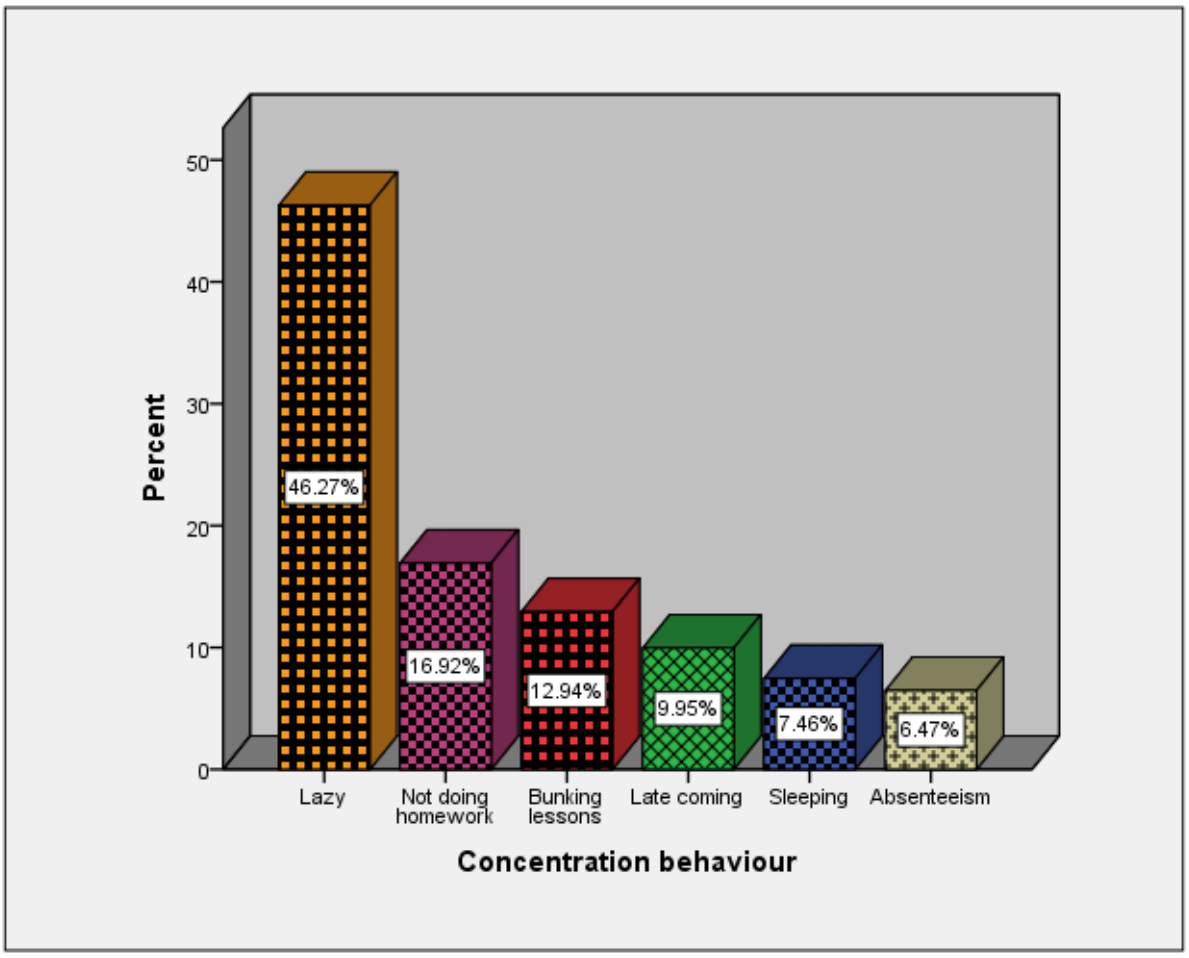



***Figure 4.2: Types of concentration behaviour and their percentages of occurrence***

#### *4.2.1.1 Laziness*

Laziness shown by some learners in mathematics lessons holds a share of 46,3% (93 times out of 201) in the category of lack of concentration behaviour (see Figure 4.2 see also Appendix E); and a share of 17.68% of all classroom misbehaviour mentioned by learners in Figure 4.5. This percentage was computed from the total number of times all behavioural types were mentioned in Figure 4.5, which was 526 times (see Appendix E). Laziness appeared 93 times, thus yielding 17.68% of appearances (see Figure 4.5 see also Appendix E). In this study learner laziness included learners' short attention span; unwillingness to participate in lesson activities; boredom; easily distracted and not focused. Most learners admitted of having a despondent attitude when it comes to learning mathematics. Most learners blamed this type of misbehaviour on themselves, while some said that it was because mathematics is boring and not easy to understand the teacher.

L39SA (see Table 3.6) admitted to having a problem with concentration, saying, "*Sometime I get distracted, I don't know how, but I realize that I am not listening, I*

*find myself thinking other thing like what I am going to do after school things like that; yes I am in class but my mind is not there*." L39SA from WPS acknowledged that "*It is me because at the end it is me deciding, I cannot blame my friends… the problem is not on the teacher or my friends but it on me because at the end it is me deciding* [what I want to do]." L50SA also admitted that lack of concentration was his number one weakness during mathematics lessons, saying "*I find difficult to control my attentiveness in class*."

This interview with learner L23SB from PPS suggested that learners' laziness could lead to other forms of learners' misbehaviour in mathematics classroom.

**Researcher(R):** *What behaviour about yourself do you find difficult to put under control in mathematics class?*
**L23SB:** *I realize that I am not serious when the teacher is teaching.*
**R:** *What do you do when you are not serious?*
**L23SB:** *I do nothing, I just sit, start talking talk (about sport), and thinking of home.*

The following interview with L29SA from WPS uncovered some of the factors that influence learners' laziness in mathematics classroom:

**R:** *What behaviour about yourself do you find difficult of you to control in mathematics lessons?*
**L29SA:** *I think being lazy.*
**R:** *What causes it?*
**L29SA:** *I don't know, sir, maybe is the hormones, sir.*
**R:** *Have you always been feeling like that?*
**L29SA:** *No, sir. It started in Grade 9, because in Grade 8 I used to do my work.*

Most learners in the poorly performing school attributed their laziness to the timing of mathematics lesson on their timetable. In terms of this timetable a mathematics lesson was held in an afternoon period. For instance, L20SB said: "*After break* [in the afternoon] *all learners are bored and tired and so they misbehave and others just sleep*." In justifying the reason for their boredom in mathematics lessons L10SB said

"*in the morning we have energy, but after the break most of the time we don't listen, we are tired*." To highlight the extent to which classroom laziness influences learners' performance in mathematics, L10SB said, "*During the lesson you will find maybe only five learners listening to the teacher.*"

#### *4.2.1.2 Not doing homework or classwork*

Learners' tendency not to do mathematics homework or classwork counted for 6.47% of all classroom misbehaviour mentioned by learners during the interviews (see Figure 4.5). This type of misbehaviour seemed to be influenced by various factors, including failure to understand the topic, fear of failure after trying, hiding ignorance, laziness, or simply by being defiant. During interviews with learners, 20% said that they always do their mathematics classwork and homework. The remaining 80% of learners said that sometimes they did not do the homework or classwork because they did not understand the content or, as mentioned by learner L46SB: S*ometimes I forgot that I have homework.*

In the well-performing school the mathematics teacher seemed to take the misbehaviour of learners who do not do their homework seriously. This view came from learners' responses interviews:

> ***R:*** *Are there some learners' misbehaviours that the teacher takes more seriously than others?*
> ***L10SA:*** *Only if you did not do his homework. If you did not do the homework you sit on the floor.*

In the light of learners' responses it became clear that learners in the well-performing school would not just choose not to do the homework activity. At times they could not do their homework because of their limited understanding of the topic. But it became clear that the teacher would not take it well if learners did not do the homework, and learners were seemingly reluctant to fall victims to the trap of not doing the homework. One of the researcher's conversations with the learners in the well-performing school is presented below.

> ***R:*** *What does the teacher do when you did not do homework?*
> ***L22SA:*** *He makes you sit on the floor.*

***R:*** *Have you ever been told to sit on the floor?*

***L22SA:*** *Sir, I was only told to sit on the floor for not doing the homework, which I did not understand.*

Learners in the poorly performing school echoed the sentiment that at times the reason for not doing the homework was that they were not able to do the tasks in it. Some of the learners' responses are documented:

***R:*** *Do you do your homework every time it is given to you?*

***L20SB:*** *Sometimes.*

***R:*** *Do you forget to do it or it is hard?*

***L20SB:*** *Most of the time it is hard.*

***R:*** *Which topic do you find to be very hard?*

***L20SB:*** *Geometry, when it comes to geometry I try to do my homework, but it is not easy.*

#### *4.2.1.3 Bunking mathematics lessons*

Learners' misbehaviour of bunking mathematics lessons holds a share of 4.94% of all classroom misbehaviour mentioned by learners during the interviews see figure (4.5). The following interview with learner L29SA from WPS shows that learners bunk lessons for two reasons:

- ***The teacher is strict on classroom behaviour and learners fear the punishment when they have not done their homework.***

Learners' bunking mathematics lessons because of fear of punishment is brought to the fore in the following interview abstract:

***R:*** *Would you say learners bunk lessons because the topic is hard or for other reasons?*

***L29SA:*** *I would say it is the homework, sir. Mostly learners are scared to sit down on the floor and to serve detention after school.*

Learner L37SB from PPS stated that some learners tended to bunk classes if they felt that they did not have freedom to do what they wanted to. The second reason for bunking lesson was linked to the following:

- ***Learners are lazy and bored or some are craving for a cigarette.***

Next are some of learners' responses that are associated with the second reason.

***R:*** *Do you mean that learners waste time?*

***L29SA:*** *Some of them, they even bunk and go to the field.*

***R:*** *Don't you think maybe they are craving a cigarette?*

***L29SA:*** *Yes also.*

***R:*** *Does it happen that learners bunk lessons simply for smoking?*

***L29SA:*** *Yes it does happen; even the teacher knows about it.*

***R:*** *How often do these things happen?*

***L29SA:*** *Everyday, sir.*

Learners in both schools expressed various reasons for bunking their lessons. These included (i) lying to the teacher saying that they were going to the office; (ii) pretending that they needed to go out of the lesson for a drink of water; or, (iii) pretending that they were sick. These would constitute forms of classroom misbehaviour that the teacher would not be aware of. The study found that these forms of misbehaviour characterized mathematics instruction in both schools.

### 4.2.2 Disruptive behaviour

Disruptive behaviour emerged as the most prominent inacceptable pattern of behaviour in both schools (see Figure 4.1; Appendix D; Appendix E). Most learners complained that disruptive behaviour hindered their learning of mathematics. The forms of disruptive behaviour mentioned by learners in both schools included i) those that made it difficult to hear the teacher; ii) interrupting the sequence of reasoning during teacher-learner interaction in the classroom, hence making it difficult for learners to follow teachers' explanations during the lesson; and iii). Interference with thought process during classwork exercises. Given learners' responses, the researcher classified disruptive behaviour into six types. The classification was based on learners' insistence that each of the six types constituted a disruptive behaviour during mathematics instruction (see Figure 4.3; Figure 4.7).

The forms of disruptive behaviour with the number of times each type was mentioned by learners (in brackets) are : talkative (123); playful (22); doing other subjects (12); making a loud noise (50); starting and participating in jokes (36); and walking around the classroom (12).

Figure 4.3 shows that learners regarded being talkative as a prominent disruptive behaviour. This was followed by making noise and participating in jokes during a mathematics instruction. In the next sections each of these forms of classroom disruptive behaviour is discussed.

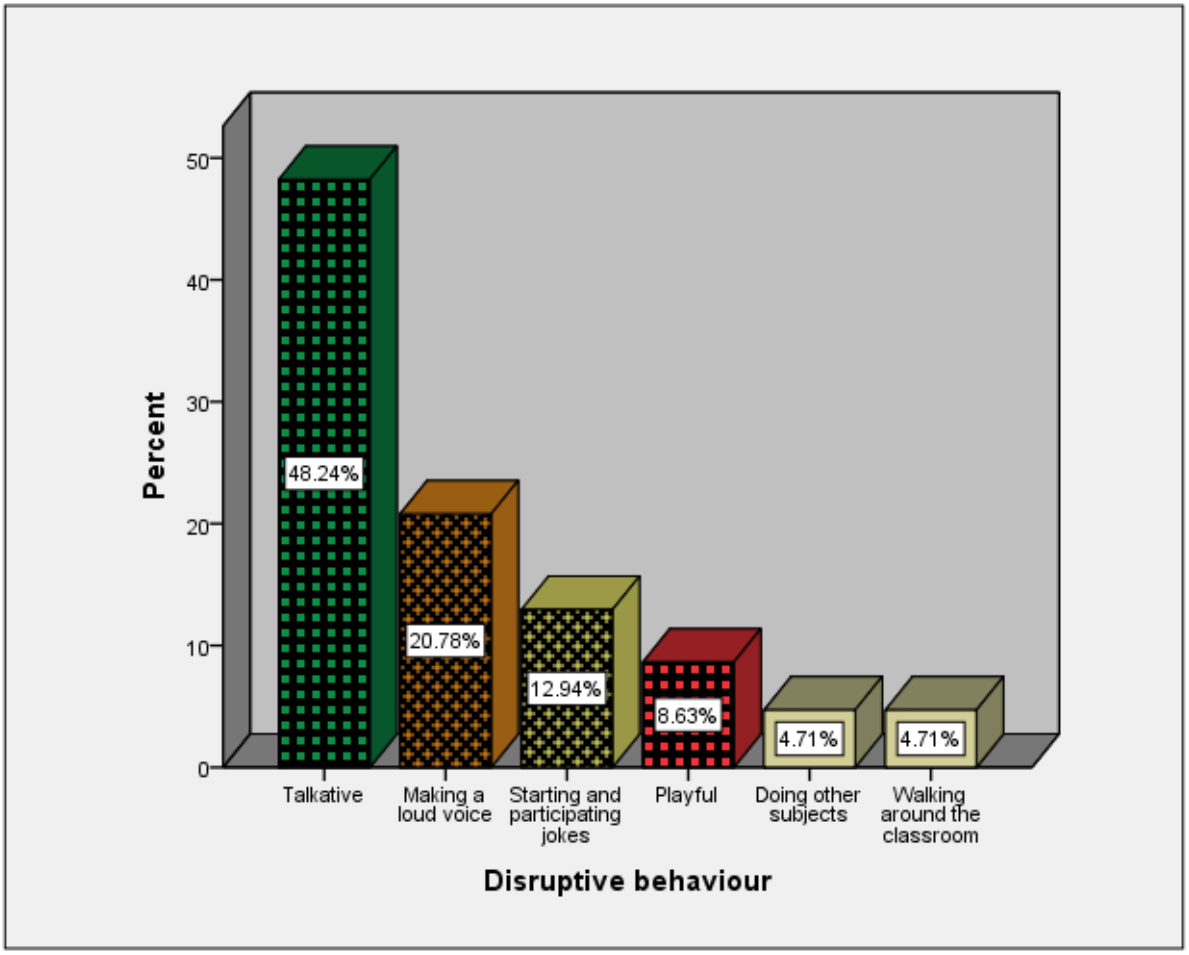



***Figure 4.3: Types of classroom disruptive behaviour identified by learners***

### *4.2.2.1 Talkativeness*

Learners' tendencies to talk out of turn during mathematics lessons held a share of 48.24% (123 times out of 255) in the category of disruptive behaviour (see Figure 4.3 see also Appendix E); a share of 23.38% (123 times out of 526) of all classroom misbehaviour mentioned by learners during the interviews (see Figure 4.5); and 12.37% contribution in all factors mentioned by learners as influencing their poor performance in mathematics (see Figure 4.7). Most learners seemed to be concerned about the casual talking that occurred during mathematics lessons. Out of 10 learners who were interviewed, nine (90%) admitted that they were talkative during mathematics instruction. They acknowledged that they contributed to the problem and found it difficult to control themselves. For instance, learners L37SB, L46SB and L23SB from PPS emphasized that being talkative was number one misbehaviour and they wished all learners to keep quiet during mathematics lessons. In addition, learner L29SA from WPS admitted that he had a tendency to be "*very talkative in mathematics*". L29SA added that this form of misbehaviour had led the teacher to change his seat to minimize talking.

Learner L29SA said that he found it difficult to control himself not to talk when everyone was talking during a mathematics lesson. The researcher asked learners to explain the kinds of things they tended to talk about, which they regarded as disrupting the flow of a mathematics lessons. Learners responded: "*We talk about many things such as what is going to happen in the next break; what happened during the last break; what happened in the weekend or things that happened on TV*."

L22SA, who was a girl, responded: "*During the lessons we may be talking about soccer or talk about a fight that has just happened in the school. During the Soccer World Cup we used to talk about Brazil and Neimah* [famous soccer player] *like that*." When learners were asked to suggest the amount of time that talkativeness claimed in the entire lesson, L22SA responded: "*Maths period is about 45 minutes,* [within this period] *about 10 minutes is wasted on talking. But not ten minutes consecutively; maybe it will take 2 minutes and another 2 minutes, and so on … and adds up to 10 minutes. So 10 minutes of the period is wasted in talking*."

#### *4.2.2.2 Excessive noise*

Learners' misbehaviour of making loud noises or shouting seemed to occupy a share of 8.68% (23 times out of 526 times) all classroom misbehaviour mentioned by learners during the interviews (see figure 4.5) and a share of 4.59% all factors mentioned by learners as influencing their poor performance in mathematics (see Figure 4.7). It must be noted that in Appendix E "excessive noise" is represented as "making noise (shouting, disrupting)" (Appendix E). Casual talk between learners seemed to occur in various forms such as learners using it as a means to express their discontentment on various issues in the classroom including (i) what they would regard as unfair treatment meted out by the teacher or their fellow learners; (ii) a response to an unexpected testing event that learners felt they are not ready to write; (iii) when learners observed that the teacher was giving an explanation that seemed to contradict the previous one; or, (iv) simply an argument with or provocation from a classmate. One learner in the WPS admitted, "*After the break we do* [make a lot of noise], *but it settles very fast."*

More instances of excessive noise-making were reported in the PPS than in the WPS. In comparison with the previous learner's response in WPS, learner L23SB from PPS stated that about 20 minutes of mathematics lessons were spent in noise-making by learners. Responses on this subject from PPS included these replies:

> ***L29SA*****:** *Even a teacher ends up forgetting that he is in the middle of explaining something important because he has to attend to learners' misbehaviour, and when it is settled the teacher does not come back to it and explain it again.*
>
> ***L46SB:*** *If learners could keep quiet and I concentrate I could understand maths but when there is noise I become confuse and mix things.*

#### *4.2.2.3 Learners' participation in jokes*

This form of classroom misbehaviour claimed 6.84% (36 times out of 526 times) of all types of classroom misbehaviour mentioned by learners during the interviews (see Appendix E). Learners from the WPS and PPS said that they were affected by the level of lesson disruption, which included participating in jokes during a mathematics lesson. L39SA said, *"If everyone could be focused and stop the jokes I could understand maths."* L20SB confessed of been guilty of participating in jokes sometimes. L10SB admitted: "*I only laugh when it is funny*." The extent to which this form of classroom misbehaviour occurred during mathematics instruction was

mentioned by learner L50SA: "*Maybe after every 10 minutes"*. While saying or acting a joke can only take a few minutes, the effect on learning may last much longer as stated by learner L50SA: "[The problem with jokes is that] *when I think of a joke I think something else about the joke, I become distracted much longer after the joke has ended, my mind keeps on wandering."*

These abstracts from interviews show one kind of joke that was prevalent in WPS and its presumed effect on learners' performance in mathematics:

> ***R:*** *Which kinds of learners' classroom behaviour make it difficult for you to learn mathematics?*
> ***L39SA:*** *Making jokes.*
> ***R:*** *What kind of jokes?*
> ***L39SA:*** *Like coping* [impersonating] *the teacher's accent; and saying different things and that will make me laugh down to the earth.*

It seemed that in WPS, learners impersonated their mathematics teacher without his knowledge. However, in PPS this type of a joke was openly directed to learners. During mathematics lessons this would undermine their confidence and self-esteem. The effect of this form of classroom behaviour is illustrated in this interview abstract in PPS:

> ***R:*** *Have you ever noticed learners making jokes and teasing another learner who fails to solve a sum or problem in mathematics?*
> ***L46SB:*** *Yes, sir, it is like me when I raise my hand to ask a question, they start laughing. I don't know why.*
> ***R:*** *How does that make you feel?*
> ***L46SB:*** *It makes me feel like my question is a joke or useless.*
> ***R:*** *Does that discourage you from asking questions?*
> ***L46SB:*** *Yes, because every time they start to laugh, sometime I feel like my English is not good.*

### 4.2.3 Anti-social behaviour

In the context of this study, types of learners' anti-social behaviour referred to learners' bad manners and disrespectful tendencies toward fellow learners, teachers

and other school personnel. The following anti-social behaviour that learners identified during the interview session are classified in seven types with the accompanying scores in brackets: arrogance and insubordination (18); aggressiveness and gambling (18); smelling smoking or dagga (17); smelling or smoking a cigarette (10); smelling or drinking liquor iii); vandalism and throwing objects in the classroom (4).

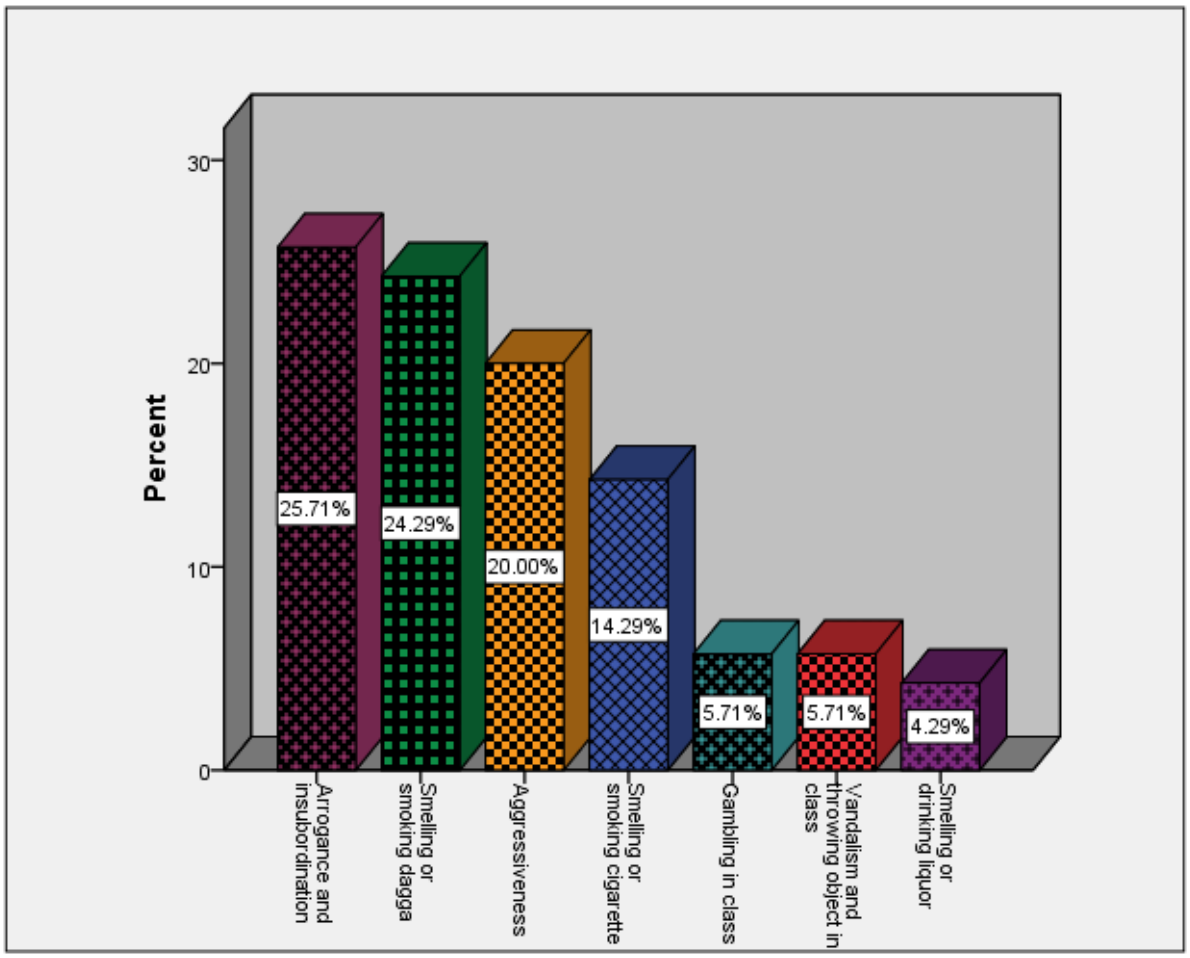



***Figure 4.4: Types of antisocial behaviour that learners identified***

The following sections discuss the data in Figure 4.4.

#### *4.2.3.1 Arrogance and insubordination*

Learners' arrogance and insubordination claimed 3.42% (18 times out of 526 times) of all classroom misbehaviour mentioned by learners during the interviews (Figure 4.5, see also Appendix E). Arrogance and insubordination was ranked ninth in the most prominent types of learners' misbehaviour in the mathematics classroom, but

ranked first among the types of anti-social behaviour identified by learners in both schools. Learners' anti-social behaviour in mathematics classroom tends to similar to the general behaviour of the whole school. Learners who manifest arrogance and insubordination during mathematics lessons do so in the pretence of expressing their rights to education. This is shown in the interview with learner L10SB:

> ***R:*** *Have you ever refused to take instruction from the teacher?*
> ***L10SB:*** *Yes, sometimes, when I don't see the reason why I must stand up.*
> ***R:*** *Do other learners also refuse to take similar instructions from the teacher?*
> ***L10SB:*** *The teacher cannot just come and say stand up, we don't know the reason why we should stand up. We first have to debate about it then we stand up.*

Learners' arrogance and insubordination are mostly directed to a teacher in front of the whole class, which might cause embarrassment; break the teacher's self-esteem, thus causing dissatisfaction with his or her profession. Therefore this type of behaviour may need to be investigated to see how much it influences the stability and movement of mathematics teachers. In WPS learners stated that they generally respected their teachers. The same situation could not be identified in PPS. For instance, learner L37SB said that learners in her class respected the teacher because she is a woman. L10SB acknowledged that not all learners respected their teacher. It became evident that one reason for learners' insubordination and arrogance towards the teacher was the gangsterism spirit in PPS. Learners used gangster lingo as a means of daily communication in school, which would encourage certain antisocial behaviour among learners. For instance, learner L20SB from PPS said that most boys use *tsotsi*[13] language in their normal conversation. Learner L10SB said that *tsotsi* language has been the prominent language in the school since he was in Grade 8.

13. In South Africa a *tsotsi* is someone who is a member of a group that is engaging in criminal activities such as housebreaking, stealing from other people. In most instances *tsotsis* are not employed and make a living by taking from other people. Sometimes this way of life may catapult them to richness and may eventually look enviable to the young and upcoming teenagers. They invent their own language of communication, which is known in South Africa as *tsotsi taal*, with the word "taal" taken from Afrikaans referring to "language". It is therefore common for youngsters to emulate these groups at schools, especially when bullying their schoolmates.

#### *4.2.3.2 Aggressiveness and gambling*

Learners' aggressiveness has a share of 2.66% of all classroom misbehaviour mentioned by learners during the interviews. In some cases learners become aggressive when gambling or betting (0.76%) is taking place during mathematics lessons (see figure 4.5). The teacher may try to contain the situation. However, the learner who is losing in the game (gambling) would insist on playing again to regain his money. In some cases learners cooperate in the classroom only to settle their disputes outside or when they change periods, which also influences their coming late to mathematics lessons.

> ***R:*** *What kind of behaviour of other learners that makes it difficult for you to cope with mathematics?*
> ***L20SB:*** *If they can stop the spin* [spinning money as one form of gambling].
> ***R:*** *Do they spin money in the class as a game or as gambling?*
> ***L20SB:*** *They are gambling while the teacher is teaching.*
> ***R:*** *What does the mathematics teacher do?*
> ***L20SB:*** *He does not see them.*
> ***R:*** *Do learners fight when they lose money?*
> ***L20SB:*** *No they don't fight; they understand one another.*
> ***R:*** *So learners make money in the classroom.*
> ***L20SB:*** *Yes, they say it is a business.*
> ***R:*** *What do they do with the money they win?*
> ***L20SB:*** *The winner buys himself what he wants, cool drink, kota* [bread] *and whatever he wants.*

Hence gambling occupies a small margin of 0.4% of all shares that contributed to learners' performance in mathematics.

#### *4.2.3.3 Smoking marijuana*

Smoking marijuana, or dagga as it is known in South Africa, constitutes 3.24% of all classroom misbehaviour mentioned by learners during the interviews (see figure 4.5). While there was no direct confession by any learner of using marijuana to enhance mathematics comprehension and performance, 90% (9 out of 10) of learners acknowledged that they had been influenced by the local belief that "*if learners smoke dagga before mathematics examination they will perform better*", as

stated by one of the learners. The next abstract from a learner's interview illustrates the general belief about the usage of marijuana:

***R:*** *Have you heard learners saying that if you smoke dagga you will pass a mathematics test?*

***L37SB:*** *Yes, some say that when you smoke, you don't forget everything that you have learned.*

***R:*** *Is mathematics the reason why learners smoke dagga?*

***L37SB:*** *Some smoke it as an everyday thing but not specifically for mathematics.*

This was the response of learner L29SA from WPS to the same question: *"Yes, they* [learners] *say if you smoke during an examination, suddenly you think faster and get the answers."*

To find out the extent to which learners smoke marijuana in schools, the researcher interacted with both teachers and HODs. Teachers and HODs responded that this tendency happened rarely in their schools. This was the only instance in which teachers and HODs in both schools viewed a form of misbehaviour in the same way, eventually giving it the same rating. Below are learners' responses that describe the behaviour of learners whom they perceived to be under the influence of marijuana:

***L22SA:*** *Learners who smoke dagga look like they are in another world. They do not concentrate and they disrupt others*.

**L11SA:** L*earners who have smoked dagga smell like dagga, sir … also seem sleepy in mathematics lessons*.

Learner L29SA stated that an average of five learners a week come to a mathematics lesson under the influence of dagga in her school. Figure 4.5 reflects a summary of types of behaviour learners perceived to characterized mathematics instruction in both schools. These forms of classroom behaviour by learners have already been discussed in the preceding sections. It must also be noted that these forms of behavioural patterns in Figure 4.5 tended to come into play on different scale levels in the PPS and WPS.

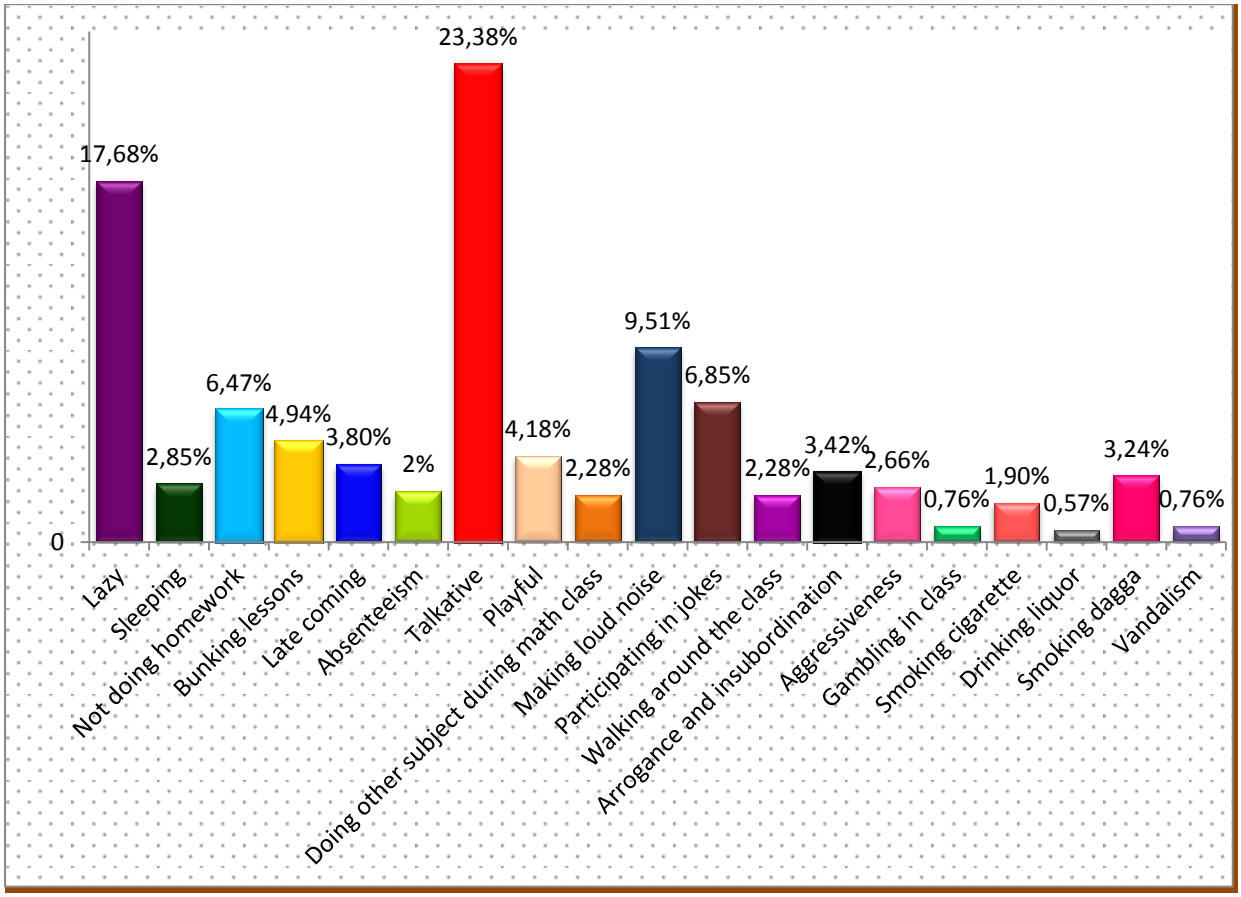



***Figure 4.5: Types of learners' misbehaviour as perceived by interviewed learners***

In the next section the perceptions of teachers and HODs are explored in an attempt to evaluate the extent of agreement in terms of the types of classroom behaviours that were mentioned by learners.

## 4.3 PERCEPTIONS OF HEADS OF DEPARTMENT AND TEACHERS OF CLASSROOM MISBEHAVIOUR

Descriptive statistics were used to analyse the perceptions of teachers and HODs on the types of misbehaviour that learners tend to manifest during mathematics lessons. Teachers and HODs scored each item in the questionnaire relating to a specific type of learner misbehaviour that had been raised by learners in earlier interview sessions (see Appendix B). The questionnaire items were organized into the three forms of classroom misbehaviour identified by learners (see Section 3.5.2.2). The mean scores were determined using simple percentage. Table 4.2 reflects teacher and HOD questionnaire responses relating to learners' concentration behaviour in mathematics classrooms. The data in Table 4.2, which largely reflect teachers' and HODs' responses, are presented in comparison with the data that were collected in

earlier interviews with learners (see Section 4.3). The internal reliability of teacher and HOD questionnaires was computed using the Cronbach's alpha coefficient, which yielded the value $\alpha$=0.936. Therefore the results of the questionnaire could be considered reliable (see Section 3.5.4.1; Cronbach, 1951).

***Table 4.1: Teacher and HOD responses on learners' lack of concentration***

| **LEARNERS' VIEWS** | | **TEACHERS' AND HODs' PERCEPTIONS** | | |
|---|---|---|---|---|
| **Types of misbehaviour** | **Number of times mentioned (%[14])** | **Questions to teachers and HODs by means of questionnaires** | **Teachers** | **HODs** |
| | | | **Average responses on Likert scale** | **Average responses on Likert scale** |
| Laziness | 9.4% | Learners are not willing to participate in classroom discussion even though they know the answers | 3.5 | 2 |
| | | Learners reluctantly attend extra mathematics lessons organised by the school | 4 | 1.5 |
| Not doing homework or class work | 3.4% | To what extent do learners complete mathematics homework? | 3.5 | 2.5 |
| | | Learners have a tendency of writing notes and corrections than doing class work exercises and homework | 4 | 2 |
| | | Learners do not bring correct stationary for mathematics even though they have them at home | 3.5 | 2.5 |
| Bunking lesson | 2.6% | Learners have a tendency of bunking maths lessons (at least 2 learners in class) | 2.5 | 2.5 |
| | | Learners give different reasons to go out of the class | 3 | 1.5 |
| Late | 2.0% | Learners have a tendency of being late at school (at least 2 learners in class) | 3.5 | 3 |
| | | Learners take 5 to 10 minutes to settle in mathematics class. | 3 | 2.5 |
| | | To what extent have you been under pressure to complete the syllabus because you spend so much time with learners, helping them to grasp fully certain topic in mathematics? | 3.5 | 2.5 |
| Sleeping | 1.5% | | | |
| Absenteeism | 1.3% | Learners have a tendency to be absent from | 4 | 3 |
| **Total** | **20.2%** | | **38** | **25.5** |
| Mean | **3.37%** | | **3.45** | **2.32** |

14. In Appendix E, the table matrix is used to compute the number of times each misbehaviour type is mentioned by learners. To achieve this ticks (√) are utilised. The percentage (%) allocated to each type of misbehaviour is computed by: $\% = \frac{Number\ of\ (\surd)\ for\ each\ misbehaviour\ type}{Total\ (\surd)\ for\ all\ \ misbehaviour} \times 100.$

In Table 4.1 it can be observed that teachers' average score on learners' concentration misbehaviour indicated that they perceived it to be happening sometimes. Teachers seemed to identify the following types of learners' misbehaviour as occurring most frequently: absenteeism; tendency to write the notes only; and refusal to attend extra lessons organised by the school. Teachers' perceptions of learners' lack of concentration were different from those of the HODs, who stated that these forms of behaviour occurred on rare occasions during their mathematics teaching.

***Table 4.2: Teachers' and HODs' responses on learners' disruptive behaviour***

| **LEARNERS VIEWS** | | **TEACHERS AND HODs' PERCEPTIONS** | | |
|---|---|---|---|---|
| **Types of misbehaviour** | **Number of times mentioned (%)** | **Questions to teachers and HODs by means of questionnaires** | **Teachers** | **HODs** |
| | | | **Average responses on Likert scale** | **Average responses on Likert scale** |
| Talkative | 23.38% | During mathematics lessons, to what extent are learners talkative? | 3.5 | 2 |
| | | Learners talk out of turns (at the same time) when the teacher asks a question during mathematics lesson | 3 | 2 |
| Making excessive noise | 9.51% | Starting an argument or provocation with a classmate | 3 | 2 |
| | | As a mathematics teacher I get frustrated to the point of thinking to change my teaching career because of learners' misbehaviour | 3 | 1 |
| Participating in jokes | 6.85% | During mathematics lessons, to what extent do learners start and participate in jokes? | 3 | 2 |
| | | Some learners participate in mathematics lesson only to impress their classmates | 2.5 | 1.5 |
| Doing work of other subjects during mathematics lessons | 2.28% | During mathematics lesson a number of learners are busy with electronic gadgets | 2.5 | 1 |
| | | Learners do not engage with others in an organized mathematics study group | 4 | 2.5 |
| Walking around the classroom | 2.28% | Learners do not bring correct stationary for mathematics so that they can be allowed to borrow these from other classes | 3.5 | 2 |
| **Total** | **44.3%** | | **28** | **16** |
| Mean | **8.86%** | | **3.1** | **1.78** |

The total means scores in Table 4.2 show that teachers perceived disruptive behaviour as something that occurred sometimes. The HODs perceived disruptive behaviour as something that occurred rarely. Teachers scored higher on these aspects: learners' tendency to be talkative; learners' disruptions during group work; and learners walking around the classroom without permission.

***Table 4.3: Teachers' and HODs' responses on learners' anti-social behaviour***

| **LEARNERS VIEWS** | | **TEACHERS AND HODs' PERCEPTIONS** | | |
|---|---|---|---|---|
| **Types of misbehaviour** | **Number of times mentioned (%)** | **Questions to teachers and HODs by means of questionnaires** | **Teachers** | **HODs** |
| | | | **Average responses on Likert scale** | **Average responses on Likert scale** |
| Arrogance & insubordination | 1.8% | Have you ever been told by a learner that he has a right to behave in a certain way, while his or her actions are disrupting the teaching and learning? | 2.5 | 1 |
| | | Is there *izikhothane* (local gangster group) behaviour among learners? | 3.5 | 2 |
| Aggressive & Gambling | 1.4% | Have you ever been involved in learner-teacher confrontation? | 2 | 1 |
| | | To what extent do learners gamble, including playing dice or betting for money? | 2.5 | 2.5 |
| Smoking dagga | 1.7% | There are a number of learners who smoke dagga (marijuana) or abuse other drugs | 2 | 2 |
| Smoking cigarette | 1.0% | There are a number of learners who smoke cigarette | 2.5 | 2.5 |
| Vandalism and Drinking liquor | 0.7% | There have been acts of vandalism to school property by learners | 3.5 | 2.5 |
| | | There are a number of learners who drink alcohol | 2.5 | 2 |
| **Total** | **6.6%** | | **21** | **15.5** |
| Mean | **1.32%** | | **2.6** | **1.94** |

The total means scores in Table 4.3 show that teachers perceived that learners' anti-social behaviour occurred sometimes during their teaching. HODs perceived the

same misbehaviour as occurring on rare occasions. Learners' spirit of gangsterism, and smoking cigarettes and marijuana proved to be the most frequently observed forms of misbehaviour. Teachers and HODs reported that they rarely experienced teacher-learner confrontation.

### 4.4 GENERAL PERFORMANCE OF LEARNERS IN TWO SCHOOLS

The mathematics performance of all learners who participated in the study was analysed for a period of six months (see Section 1.1; Section 1.3.1; Section 1.3.3; Section 3.5.2.1; Section 3.5.4.3). Figure 4.6 shows learners' performances in the two schools that participated in the study (WPS & PPS) (see Figure 3.1; see also Section 3.3.1.1). The blue bars represent learners' performance in WPS, and the red bars represent learners' performance in PPS (Figure 4.6).

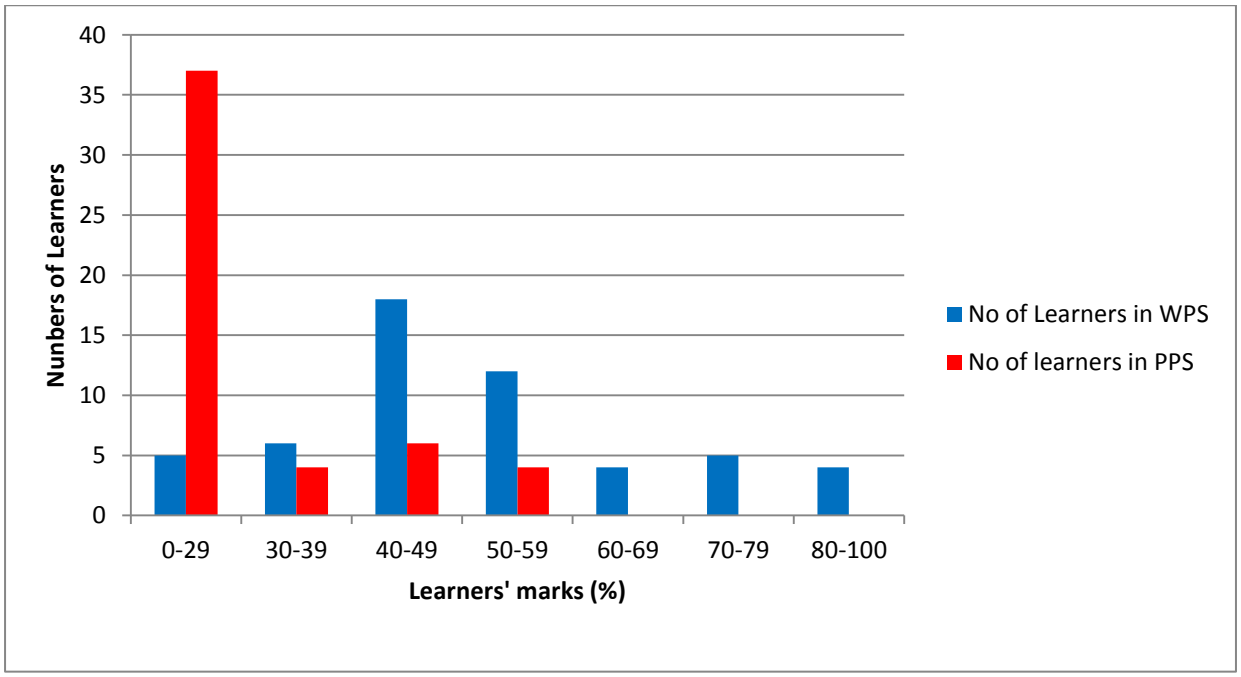



***Figure 4.6: Learners' average performance scores accumulated over six months***

The performance of learners in Figure 4.6 is accumulative and represents learners' averages in Grade 10 mathematics computed over six months in both WPS and PPS (see Section 3.3.1.1; see also Section 3.6.1). The averages, which are presented in Figure 4.6, were computed from 54 learners from WPS and 51 learners from PPS (see Section 3.3.1.2; Figure 3.1). From these learners in both schools 5 learners

were randomly sampled to participate in the interviews (Section 3.3.1.2). Document analysis determined that 37 learners out 52 (71%) from PPS had an average that placed them in the performance category of 0-20 in Grade 10 mathematics over six months (see Figure 4.6). The same analysis procedure showed that in the WPS, and over the same period, only 5 learners out of 54 (9%) were placed in the performance category of 0–29 (Figure 4.6). Figure 4.6 shows that only WPS had performers (learners) in the categories 60–69, 70–79 and 80–100. Learners' performance in PPS went as far the performance category of 50–59. Figure 4.6 shows that there were fewer than 5 performers from PPS in the category 50–59, while in the same performance category 12 learners from WWP appeared (see Figure 4.6).

## 4.5 LEARNERS' VIEWS ON FACTORS INFLUENCING THEIR PERFORMANCE

The study has determined types of learners' unacceptable classroom behaviour that mostly evident during mathematics instructions in both schools. These forms of classroom behaviour, most of which have been classified as misbehaviour in the current study, were documented through the interview with learners (Section 4.3) and self-reporting questionnaires with teachers and HODs (Section 4.4; see also Table 4.2; Table 4.3; Table 4.4). Part of the aim of the current study was to determine the impact of these forms of learners' classroom behaviour on mathematics performance of learners in Grade 10 (see Section 1.2; see also Section 1.6.4).

To achieve this part of the aim, the researcher constructed a set of interview items that probed learners on types of behaviour that they perceived as affecting their mathematical performance (see Section 1.10.2). The learners (n=10) who participated in the interviews in Section 4.3 responded to the questions about the types of classroom behaviour that impacted on learners' poor performance in mathematics (see Figure 3.1). These questions were posed during the interviews that are documented and analysed in Section 4.3. Questions that the researcher asked the learners included:

- *Amongst the types of classroom misbehaviour that learners show during a mathematics lesson which one do you think affects your mathematics performance negatively? You can mention more than one if you want?*

- *In what way do you think the behaviour you have mentioned is influencing your performance in mathematics?*

In answering the interview questions relating to the impact of behaviour on mathematical performance, respondents were inclined to mention factors that were not necessarily linked to misbehaviour such as the time element, teaching methods, and the curriculum. However, all learners' responses are captured in Table 4.5 and presented in Figure 4.7. In addition, Table 4.5 and presented in Figure 4.7 show the percentages of the number of times each factor was mentioned by learners.

***Table 4.5: Factors that learners perceived to impact on their performance in mathematics***

| Factor mentioned by learners | Frequency of occurrence | Percentage (%) | Cumulative percentage |
|---|---|---|---|
| Learner behaviour | 27 | 52.9 | 52.9 |
| Mathematics curriculum | 10 | 19.6 | 72.5 |
| Teacher's method of teaching | 6 | 11.8 | 84.3 |
| Friends and family | 6 | 11.8 | 96.1 |
| Time factor | 1 | 2.0 | 98.0 |
| Examination anxieties | 1 | 2.0 | 100.0 |
| **Total** | **51** | **100.0** | |

Table 4.5 and Figure 4.7 show that, irrespective of learners giving responses that fell outside the scope of classroom behaviour, such as mentioning the factor of family and friends, learner behaviour was referred to prominently during the interviews. This aspect was mentioned 27 out of 51 times in which all factors were referred to by learners (see Table 4.5) and is represented as 52.94% in Figure 4.7 Learner behaviour is therefore perceived by learners to be the most influential factor on learners' poor performance. This view emanated strongly from learners in both schools. Learners felt that improvement in classroom behaviour might influence positively their performance in mathematics. For instance learners indicated that one aspect of classroom misbehaviour "talkativeness" had more impact on their performance in mathematics than other factors mentioned with the exception of the difficulty of learning mathematics as a subject (see Figure 4.7).

The Figure 4.7 exhibits all factors influencing learners' performance in mathematics as mentioned by Grade 10 learners in descending order. Factors that are outside the scope learners' behaviour are presented in purple bar; forms disruptive behaviour in a red bar; forms of lack of concentration and inert of learning in blue bar; and antisocial behaviour are presented in green colour. The descending order arrangement facilitates in comparing the impact of each element of inappropriate learners' behaviour on the overall factors that negatively impact on learners' performance.

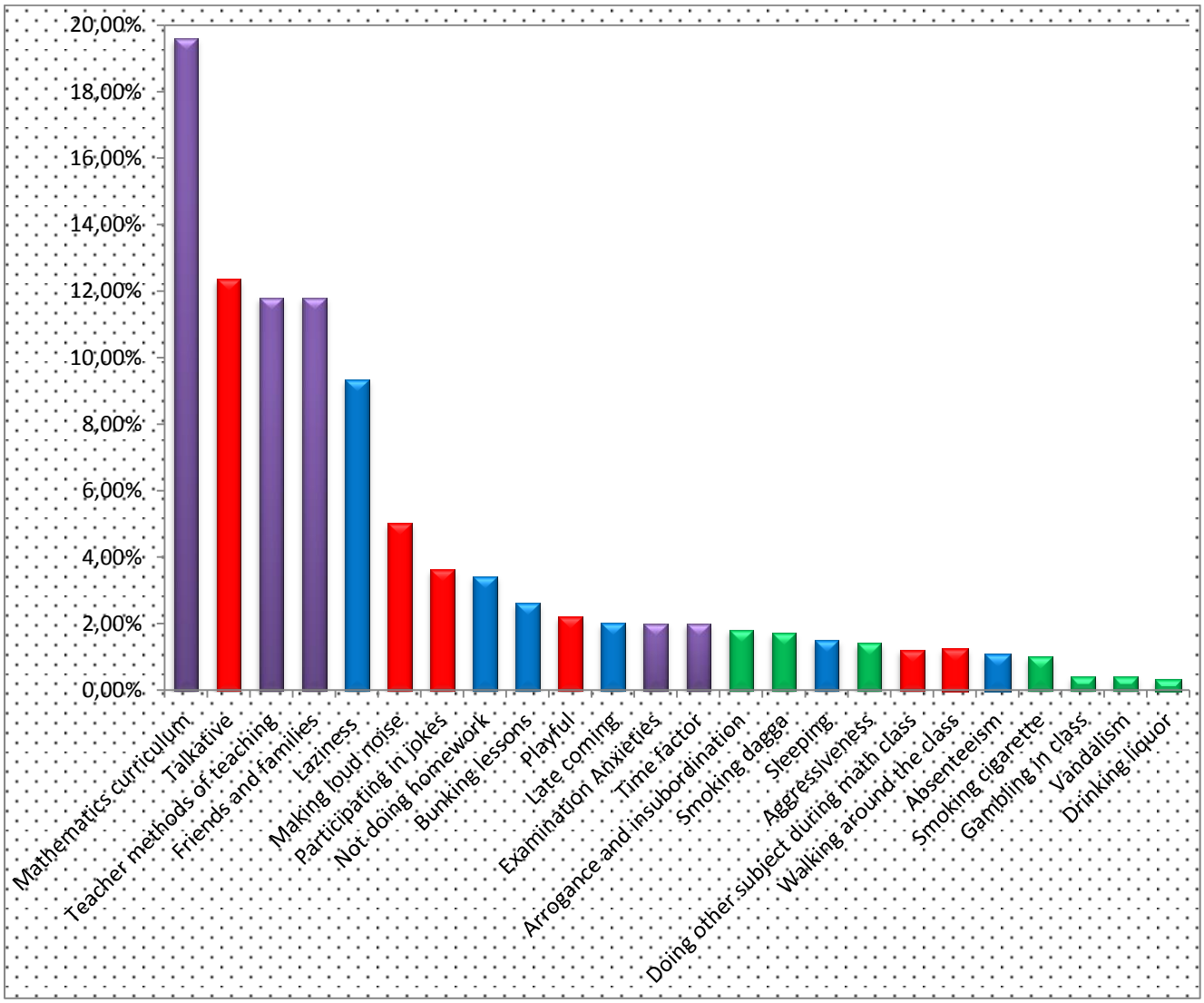



***Figure 4.7: All factors influencing learners' performance in mathematics including all forms of learners' classroom misbehaviour in descending order***

## 4.6 SUMMARY OF THE CHAPTER

Chapter 5 presented the results of the study that emanated from the data that were collected through i) document analysis (Section 3.5.2.1; Section 4.5; Figure 4.6); (ii) interviews with n=10 learners (see Section 3.5.2.3; Figure 4.3; see also Figure 3.1); and, (iii) questionnaire administration with n=2 teachers and n=2 HODs (Figure 3.5.2.2; Section 4.4). The study used simple statistics of percentages and frequencies to analyse learners' mathematical performances that were accumulated over six months in both schools (see Section 4.5; Table 4.1). Thematic and typological methods of analysing qualitative data were used to scrutinize interview data from learners (see Section 4.3). However, interview data are presented in a bar graph of percentages using simple descriptive statistics (see Figure 4.5). Finally, data collected from teachers and HODs through the questionnaire were analysed using simple descriptive statistics (see Section 4.4; see also Table 4.1; Table 4.2; Table 4.3). In the next chapter the results of the study are discussed in terms of the aim (Section 1.2) and the research questions of the study (Section 1.6). In addition, the literature review section and the conceptual framework are used to interpret the results of the study (Chapter 2; see also Section 2.7 Figure 2.1; Figure 2.2).

# CHAPTER FIVE

## DISCUSSION OF RESULTS, CONCLUSION AND RECOMMENDATIONS

### 5.1 INTRODUCTION

The aim of this study was to identify forms of behaviour manifested by learners during mathematics instruction, and to assess the impact behaviour have on the mathematics performance of learners (Section 1.2). This chapter discusses the results of the current study that relate to: (i) identification of forms of inappropriate behaviour exhibited by Grade 10 learners in the mathematics classroom; and, most importantly, (ii) the impact of these forms of inappropriate behaviour on their mathematical performance. This discussion is in line with the main research question of the study, which asked (Section 1.7):

> *What impact does Grade 10 learners' behaviour have on their performance in mathematics as perceived by Grade 10 mathematics learners and teachers in Johannesburg East District?*

To answer the main research question of the study there were four sub-questions that guided the study (see Sections 1.7.1, 1.7.2, 1.7.3 & 1.7.4). The discussion of the results in this chapter will also be facilitated by the related literature in Chapter 2 and the conceptual framework of the study (Section 2.7; Figure 2.1; Figure 2.2). The discussions will be followed by conclusions and recommendations of the study.

### 5.2 SUMMARY OF THE STUDY

The study aimed to identify forms of behaviour manifested by learners during mathematics instruction, and to assess the effects behaviour might have on the mathematics performance of learners (Section 1.2). Data from Grade 10 mathematics teachers and HODs were collected using questionnaires (Section 3.5.2.2; Section 4.4; see also Tables 4.1, 4.2 & 4.3). Participants consisted of Grade 10 learners (n=10) who were doing mathematics, 2 Grade 10 mathematics teachers, and 2 mathematics HODs. Data relating to classroom behaviour and learners' performance were collected through semi-structured interviews and document

analysis, respectively (see Section 4.4; Figure 4.1; Figure 4.5; see also Section 4.5; Figure 4.7). The study followed a qualitative approach, with phenomenological research design (Section 3.2). The collection of data and its analysis are summarized in Table 5.1.

***Table 5.1: Summary of data collection and data analysis procedures for the study***

| Type of research question | Source of data | Section of the report in which it is analysed |
|---|---|---|
| Main (Section 1.7) | Learners' interviews | Section 4.6 |
| Sub-research question 1 (Section 1.7.1) | Learners' interviews | Section 4.3 |
| Sub-research question 2 (Section 1.7.2) | Teachers' & HODs' questionnaires | Section 4.4 |
| Sub-research question 3 (Section 1.7.3) | Document analysis (learners' scores) | Section 4.5 |
| Sub-research question 4 (Section 1.7.4) | Learners' interviews | Section 4.6 |

It is evident in Table 5.1 that most of the data for the study were collected through learners' interviews. To support these data, a questionnaire and document analysis were administered. On the whole, the study found:

- **Forms of inappropriate classroom behaviour:** The study identified three main types of classroom behaviour that learners manifest during a mathematics instruction, namely: (i) lack of concentration (mentioned 201 times) during interviews; (ii) disruptive behaviour (mentioned 255 times); and, (iii) antisocial behaviour (mentioned 70 times) (see Section 1.10.3; Section 4.3; Appendix D; Appendix E). This meant that disruptive behaviour was more dominant than the other two forms of misbehaviour (see Figure 4.1). See Figure 4.5 for the summary of all classroom behaviour that the study established.
- **The impact of classroom behaviour on performance:** The meaning of the word *impact* is explained in Section 1.10.2 of this report. Learners' interview responses suggested a stronger link between learners' classroom behaviour and their performance in Grade 10 mathematics (see Section 4.6; see also Table 4.5; Figure 4.7), meaning that learners' misbehaviour during a

mathematics instruction had a negative impact on their performance in mathematics.

## 5.3 DISCUSSION OF RESULTS

### 5.3.1 Objectives of the study

Study objective 1 (Section 1.3.1): In terms of this objective the types of behaviour that learners manifest during a mathematics lessons were identified by means of an interview session with learners. The analysis of data was conducted in Section 1.4 and through this analysis the types of learners' classroom behaviour were identified (see Figure 4.1; Figure 4.5). Therefore this objective of the study was accomplished.

Study objective 2 (Section 1.3.2): In terms of this objective a questionnaire was administered to document teachers' and HODs' perceptions of inappropriate behaviour patterns that were generated through the first objective of the study (learners' interviews). Teachers' and HODs' perceptions, in comparison with learners' views on types of classroom behaviour, were documented in Table 4.1, Table 4.2 and Table 4.3. Therefore this objective of the study was accomplished.

Study objective 3 (Section 1.3): In terms of this objective learners' performance was averagely computed through accumulative scores of learners' mathematics marks over six months. The average performance of each school was computed and it became evident that WPS performs better than PPS over the same period of observation. These results were discussed in Section 4.4 (see also Figure 4.6). Therefore this objective of the study was accomplished.

Study objective 3 (Section 1.3): In terms of this objective, factors that were perceived to influence learners' performance in Grade 10 mathematics were established through an interview process with learners. Most of these factors were mentioned in Section 4.5; Table 4.4 and Figure 4.7 illustrate that learners' classroom behaviour during mathematics lessons was a prominent factor influencing learners' performance. This objective was directly linked to the main research question of the study. Therefore this objective of the study was accomplished.

### 5.3.2 Discussion of results relating to the research questions of the study

#### *5.3.2.1 The main question of the study*

The main question of the study is posed in Section 5.1 (see also Section 1.7). This question related to study objective 3 (Section 5.3.1) and sub-research question 4 (Section 1.7.4). In Section 4.5 learners gave types of classroom behaviour that they perceived to have impact on their mathematical performance (see Table 4.4). These were learner behaviour; the mathematics curriculum; methods of teaching; friends and family; the time factor; and examination anxiety (see Figure 4.7).

Using Huitt's (1997) model it is possible to realize that most of the factors mentioned by learners in Section 4.5 could be explained (see Figure 2.2). For instance, the outer layer of Huitt's model highlights the influence of family and peer groups on the scholastic performance of learners. In the interviews learners captured the latter as 'friends and family'. The second layer of Huitt's model emphasises the influence of teacher characteristics and student characteristics (Figure 2.2). In learners' interview responses these are captured as 'learner behaviour' and 'teachers' methods of teaching'. In Huitt's model learners' behaviour within the classroom setting are seemingly at the nucleus of the model, this illustrates their possibly closer and stronger influence on learners' performance. This view is attested to by the results of the current study, which showed that learners' behaviour claimed a 52.94% share of all types of influential behaviour that learners mentioned.

The results of the current study are not unique. Tiwani (2011), Yahaya (2003) and Zikhali (2006) studied factors influencing learners' behaviour and performance in schools (see Section 2.2). These studies identified the following dominant factors: the attitude of learners; teacher attitude and qualification; subject factors; types of friends; and family and school climate. The factor of learners' behaviour as impacting on learners' performance has been identified by many studies (for examples see Mapaire, 2012; Mbugua, 2012; Thijsse, 2011; Umameh, 2006; Zan & Di Martino, 2007). Also, Sullivan's *et al*. (2014) ecological model emphasizes that a learner may display misbehaviour in a mathematics lessons because of not coping with the teachers' method of teaching. In terms of the impact of misbehaviour on learners' performance Sullivan *et al*. (2014) noted that it may be true that learners who

misbehave during a mathematics lesson find it difficult to understand even the best teacher (Section 2.2).

Therefore it is reasonable to conclude that the results of this study were in agreement with the results of many other previous studies, and may be explainable in terms of Huitt's (1997) and Sullivan's *et al*. (2014) models (see Figure 2.1 & Figure 2.2). Therefore the main question of the study was answered.

#### *5.3.2.2 Sub-research question 1*

Learners gave a list of types of learners' classroom misbehaviour that they observe during mathematics lessons. Three main types are given in Section 4.2 (see Figure 4.1; see also Section 5.2). Most types of behaviour identified in Section 4.3 are similar to those identified in studies reviewed in Section 2.5 (for examples see Charles, 1985; Ofsted, 2014). For instance, Charles (1985) found that in some unruly classes disruptions averaged 2.5 learners per minutes (Section 2.5; see also Table 2.2). Serame (2013) noted that learners' lack of concentration and boredom are the most prevalent misbehaviours in classrooms in South African rural schools, causing great concern for teachers. Therefore the results of the current study were corroborated by those of previous studies. Hence it is reasonable to conclude that the first sub-research question of the study has been answered.

#### *5.3.2.3 Sub-research question 2*

This research question is addressed in Section 4.3 of the report. In this section participants' questionnaire responses were averaged to determine the average response that reflects on participants' perceptions. In this case teachers and HODs were given a set of identified classroom behaviour types (identified from learners' interview responses) to which they needed to respond if they agreed that these types of behaviour characterized Grade 10 mathematics lessons (see Appendix B). Teachers' and HODs' responses were scored on a Likert scale (see Section 3.4.2.2). Teachers' responses indicated whether the respondents had observed a type of misbehaviour during a mathematics lesson in Grade 10.

Teachers and HODs seemed to hold different perceptions of this subject. Table 4.2 shows respondents' responses on lack of concentration. Teachers' responses ranged from 2.5 to 4.0, meaning they were closer to acknowledging that they had

observed this form of behaviour '*Most of the time*' (*M*=3.45). On the contrary, HOD scores on the same item ranged from 2.0 to 3.0, suggesting that HODs were opting to say this type of behaviour occurred '*Sometimes*' or seldom (*M*=2.32). Table 4.2 shows teachers' and HODs' responses on the disruptive behaviour. Again, teachers and HODs seemed to differ. Teachers' scores ranged from 2.5 to 4.0, suggesting they observed this type of behaviour '*Most of the time*', that is, more often (*M*=3.1). HODs responses ranged from 1.0 to 2.5, which suggests that they saw this type of behaviour '*Sometimes*' (*M*=1.78). Table 4.4 shows teachers' and HODs' responses on the anti-social behaviour. Teachers scored from 2.5 to 3.5, suggesting they saw this type of behaviour '*Most of the time*' (*M*=2.6). HODs seemed to disagree once again. The latter registered scores from 1.0 to 2.5, suggesting they observed this form of behaviour '*Sometimes*' (*M*=1.94).

It is the researcher's view that the differences between the teachers' and HODs' responses could be the result of their relative exposure to the classroom situation. In this case, teachers may be considered to be more closely associated with learners, and hence more exposed to learners' types of behaviour that are manifested during a mathematics instruction. HODs spend part of their school time dealing with management-related issues, a situation that might deprive them of maximum contact with learners. One could also argue that HODs are a symbol of authority in their schools, which may make difficult for learners to 'act up' or display their problematic behaviour in their presence. Hence HODs seemingly minimal exposure to learners' problematic behaviour might account for the types of responses they gave in Tables 4.1 to 4.3. This being said, it might be necessary to conduct another study to test the researcher's view on this matter (for example exposition of learners' types of classroom behaviour in the presence of a teacher or an HOD). Given these observations, it is reasonable to conclude that sub-research question 2 was partially answered in this study.

#### *5.3.2.4 Sub-research question 3*

The general performances of learners in both schools are shown in Section 4.4 (see also Figure 4.6). The performance of learners in WPS is relatively better than the performance of learners in PPS when the performance scores of both groups are measured within the same period, which was six months (see Section 1.3.3). Therefore this question was answered.

The research questions 1.7.1 and 1.7.2 were answered in this study by highlighting the three main forms of disruptive behaviour in mathematics classrooms as mentioned by learners and later concurred by the teachers (see Table 4.1 to Table 4.3, Figure 4.5, & Figure 4.7). In this study the impact of disruptive behaviour on learners' performance in mathematics is understood and interpreted within the context of "memory and retention model" (see Section 2.6.2). Learners' disruptive behaviour may be detrimental to fellow learners because: (i) it may obstruct the assimilation of new information into sensory memory; (ii) it may overload the limited space of the working memory; and, (iii) it may cause poor storage and retrieval of mathematical information in the long-term memory.

### 5.3.3 Discussion of results relating to the findings of the study

The study found that learners' inappropriate behaviour as expressed by learners during a Grade 10 mathematics lesson played it out in three categories: (i) disruptive behaviour; (ii) lack of concentration and inert of learning behaviour; and, (iii) antisocial behaviour (see Figure 4.1).

#### 5.3.3.1 Learners' disruptive behaviour

Learners' disruptive behaviour was mentioned by Grade 10 learners as the most prevailing form of inappropriate behaviour in mathematics classrooms constituting 49% occurrence of all forms of misbehaviour (see Figure 4.1 & Appendix E). The prominent forms of disruptive behaviour that constituted 20% impact on their scholastic performance were learners': (i) talkativeness; (ii) making loud noise; and, (iii) participating in jokes. These three forms of disruptive behaviour were mentioned more often by learners when compared to their responses relating to the influence of teachers' method of teaching, and/ or the difficulty of learning mathematics as a subject (see Figure 4.7).

Learners' feelings regarding the impact of the three main forms of disruptive behaviour was captured during the interviews (see Section 4.2.2.1 to Section 4.2.2.3). For instance one learner responded that in a quiet classroom it would be easier to learn and understand mathematics. Another learner was concerned about the 22% of learning time (10 out of 45 minutes) that is wasted every day because of learners' noise and unproductive talk by learners.

Teachers' perceptions on the three main forms of disruptive behaviour harmonised with learners' views (see Figure 4.3 & Table 4.2). Grade 10 mathematics teachers indicated that learners have a tendency of talking in the classroom most of the time. Teachers experience the following tendencies sometimes: Learners who engage in arguments and provocations and those that participate in jokes. Teachers also indicated that they sometimes get frustrated to the point of considering changing their teaching career (see Table 4.2).

The research questions 1.7.1 and 1.7.2 were answered in this study by highlighting the three main forms of disruptive behaviour in mathematics classrooms as mentioned by learners and later concurred by the teachers (see Table 4.2, Figure 4.5, & Figure 4.7). In this study the impact of disruptive behaviour on learners' performance in mathematics is understood and interpreted within the context of "memory and retention model" (see Section 2.6.2). Learners' disruptive behaviour may be detrimental to fellow learners because: (i) it may obstruct the assimilation of new information into sensory memory; (ii) it may overload the limited space of the working memory; and, (iii) it may cause poor storage and retrieval of mathematical information in the long-term memory.

#### 5.3.3.2. Lack of concentration and passive learning

Forms of behaviour relating to lack of concentration and passive learning constituted 38% of all misbehaviour mentioned by learners during an interview session (see Figure 4.1). The prominent forms of lack of concentration were learners' laziness or simply doing nothing during instructional time (see Section 4.2.1). The mentioning of learners' laziness constituted 17.68%, and was also considered to contribute to learners' poor performance in mathematics (see Figure 4.5). Other forms of behaviour are included in this section as they also contributed to passive learning. These forms of misbehaviour include: absenteeism, lateness, and bunking lessons (see Appendix E). In the same vein laziness was mentioned by learners as a form of classroom behaviour that promotes lack of concentration. In addition learners mentioned that laziness is a difficult type of behaviour that they find difficult to overcome in mathematics classrooms (see Section 4.2.1.1).

Regarding the forms of behaviour that encouraged lack of concentration and passive learning teachers provided responses that corroborated those of the learners (see

Table 4.1 & Figure 4.5). In this way teachers indicated that learners have a tendency of always coming late to the classroom. Specifically they mentioned the following: (i) at least 2 learners are always late; (ii) at least 2 learners sometime would bunk mathematics lessons; and, (iii) 5 to 10 minutes in every lesson is wasted when learners come to the lesson late. Consequently, teachers seemed to feel that they were always pressured to complete the syllabus as a result of time wasted (see Table 4.2).

The research questions 1.7.1 and 1.7.2 of the study have been answered by highlighting the four main forms of lack of concentration in mathematics classrooms as mentioned by learners and also confirmed by the teachers. These were: (i) learners' laziness, (ii) learners' absenteeism, (iii) learners' lateness, and (iv) learners' bunking of lessons. Teachers indicated that an average of 17% of learners (6 out 35 learners) per day would miss at least one lesson of mathematics (2 learners would be absent, 2 learners bunk the lesson, and 2 learners come late in class) (see Table 4.1). The study also revealed that learners also sometimes takes 5 to 10 minutes to settle in mathematics class, while others give different reasons to go out of the class. According to Carroll's (1963) models of classroom learning (ALT), the wasting of time could be tantamount to the wasting of learning opportunities. Teachers further indicated that they always felt pressured to complete mathematics syllabus as a result of the forms of classroom behaviour displayed by learners during a mathematics lesson.

In this study the impact of lack of concentration and passive learning on learners' performance in mathematics is also to be understood in terms of Carroll's (1963) models of classroom learning (ALT) (see Section 2.6.3), which states that "classroom learning is a function of time".

#### 5.3.3.3 Anti-social behaviour

This study identified seven forms of anti-social behaviour that constituted an occurrence of 13%. The forms of anti-social behaviour are: arrogance and insubordination; aggressiveness and gambling; smelling smoking or dagga; smelling or smoking a cigarette; smelling or drinking liquor; vandalism and throwing objects in the classroom (see Section 4.2.3; Figure 4.1 & Figure 4.4). These forms of behaviour were less mentioned by learners, which implied fewer instances of their direct

occurrence in the classroom. Learners connected forms of anti-social behaviour, which occur outside the classroom setting, to behaviour inside the classroom. For instance, learners' insubordination could lead to defiance to do classwork or homework (see Section 4.2.1.2); learners' arrogance results in learners' disruption with excessive noise in the classroom (see Section 4.2.2.2); cigarette craving results in lack of concentration and bunking lessons (see Section 4.2.1.3); smoking dagga results in sleeping and lack of concentration (see Section 4.2.3.3).

This implies that learners who show anti-social behaviour in mathematics lessons would have been liable of different forms of disruptive and lack of concentration behaviour. Furthermore, learners tended to avoid committing forms anti-social behaviour as these are considered extreme offenses punishable by suspending learners from school, or even expulsions (see Section 2.4.3 & Section 2.4.4). Mathematics teachers indicated that they always notice acts of vandalism to school property and noted that there is a spirit of local gangster group in school, but they were not concerned about learners' anti-social tendencies inside mathematics classroom (see Figure 4.7).

Given this background, the research questions 1.7.1 and 1.7.2 of the study were answered based on learners' views and teachers' perceptions that learners' anti-social behaviour is rare, and not a direct contributing factor to learners' poor performance inside mathematics classroom.

## 5.4 CONCLUSION

The main objectives of the study have been achieved. This study managed to reveal the behavioural patterns that Grade 10 learners manifest in the mathematics classrooms. Teachers' and HODs' perceptions on the forms of inappropriate classroom behaviour identified by the learners have been determined. The mathematical performance of Grade 10 learners who were part of the study have been taken into consideration. The impact of learners' lack of concentration behaviour has been determined in the context of Carroll's 1963 ALT (Academic Learning Time). The study found that learners' lack of concentration behaviour waste tremendous time dedicated to learning mathematics.

The impact of learners' disruptive behaviour has been determined in the context of cognitive processing model. The study found that disruptive behaviour is an obstacle to learners' ability in the process of learning mathematics, in particular new concepts. The overall impact of Grade 10 learners' behaviour was determined by computing all factors (learners' behaviour-related or not) as mentioned by learners and computing them in frequencies and percentages (see Figure 4.7).

This study concludes by saying that learners' inappropriate behaviour in mathematics classrooms need to be improved to a reasonable degree to facilitate the learning and teaching of mathematics. The review of literature in Section 2.4 has demonstrated that learners' classroom behaviour may be managed, thus maximizing possibilities to enhance learners' performance in mathematics classroom. Section 2.4 draws from SASA (1996) and DBE (2008) to demonstrate that learners' classroom behaviour could be managed. This study concludes by saying efforts should be made to improve learners' inappropriate classroom behaviour (disruptive and lack of concentration) as a potential variable to influence learners' mathematical performance.

## 5.5 LIMITATIONS OF THE STUDY

The results of the current study might have limitations in that the main variable of focus, which is *learners' behaviour in the classroom*, cannot be measured easily, but could be studied through experiences and observation (McMillan, 2012). This may limit aspects of classroom behaviour that this study attempted to link to learners' performance in mathematics. This awareness highlights the need for classroom observation, which could have generated a rich qualitative data in relation to patterns of learners' behaviour that play themselves out during mathematics lessons.

The analysis of data in this study highlights another limitation of this study that is worth considering (see Chapter 4). Two schools participated in this study (see Section 3.3.1.1; see also Figure 3.1). In Section 1.1 the two participating schools are described as *projecting contrasting performance indicators in Grade 10 mathematics*. One school is described as poorly performing (PPS) and the other is considered to be well performing (WPS) in Grade 10 mathematics (see Section 3.3.1.1, see also Figure 3.1). In addition, Section 1.1 provides a rationale for

selecting the two schools, namely, *to see if these varying scholastic performances could be linked to general behavioural patterns observed in the two schools*.

A major limitation is that this issue is superficially explored in the data analysis of this study. In fact, the report does not have a specific section that demonstrates the researcher's initiative to address this very pertinent issue of the study. This could have been as a result of minimal or non-availability of related data that could have helped the researcher to explore this critical angle of research. This is viewed as a shortcoming in the manner in which the instrumentation process overlooked the component of data collection process that could have addressed the issue of comparing student behaviour in both schools in relation to performance in both schools. The researcher acknowledges that the methodology of the study could not be set up in a way to adequately address the issue of two schools that performed differently in Grade 10 mathematics, in terms of classroom behaviour. This issue is considered in Section 5.7.

## 5.6 RECOMMENDATIONS

The findings of this study revealed that learners' lack of concentration and disruptive behaviour are the prevalent forms of inappropriate behaviour in mathematics classroom. Learners relate their (better or poor) performance in mathematics to the learning atmosphere inside the classroom which is influenced by learners' behaviour. Teaches views in this study were similar to that of learners. Hence the following recommendations are made:

- School and curriculum designers need to direct all efforts to improving Grade 10 learners' disruptive behaviour during mathematics lessons to improve learners performance in mathematics;
- District officials generally provide curriculum based training to mathematics teachers. Since learners classroom behaviour in posed to be influencing learners performance as does the curriculum factor, District officials need to provide professional support to mathematics teachers on how to curb problematic behaviour during mathematics instruction; and,
- Tertiary institutions in mathematics education in South Africa need to develop modules providing training and guidelines for teachers to deal effectively with predominant misbehaviour in mathematics classrooms.

- More innovative approaches which uses technological resources, like a classroom sound level monitor with an automated warning sound need to be developed within South African educational setting to monitor and regulate learners' level of noise in mathematics classroom.

## 5.7 FURTHER RELATED RESEARCH

Given that this study did not follow an experimental design, it did not investigate the impact of learners' classroom behaviour using rigorous statistical means that could have justified what is considered the impact of learners' classroom behaviour on their performance in Grade 10 mathematics. Given also the demonstrated significance of the influence of learners' behaviour on their scholastic performance there could be a need to replicate this study using an experimental methodology that would generate a quantifiable value of the extent of this impact. Finally, another study could be recommended in which the limitation that is highlighted in Section 5.5 is addressed. The researcher recommends a study with a carefully considered methodology to compare schools with contrasting performance trends in relation to student behaviour in comparative schools.

More studies are required to explore various learning areas and topics in mathematics that are prone to evoke more learners' disruptive tendencies and less concentration and thus direct more efforts and education resources accordingly. More studies need to be conducted in exploring various methods of teaching mathematics that minimise learners' disruptive behaviour and maximise learners' concentration in the classroom.

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# 7 APPENDICES OF THE STUDY

## APPENDIX A: Learners' interview schedule

**School code: _____Learner code _____**

**Q1 to Q11: Learners' perspective of mathematics?**

1. What subjects are you currently studying in Grade 10?
2. Which one is your favorite? And why?
3. Can you please write down for me on the piece of a paper, in a proper order from your most favorite subject to the least favorite subject?
4. Why did you rank mathematics in that particular place?
   Are you happy with your performance in mathematics in Grade 10? If so why? If not why?
5. What do you do to achieve in maths? (target)
6. What is your best performance ever recorded in mathematics?
7. What was your circumstance when you were passing mathematics? (Teacher- family- friends- age...)
8. If (a learner says that is struggling with mathematics), how long have you been struggling in mathematics, and what do you think is the reason?
9. How do you feel after trying hard but you do not pass mathematics?
10. If a (learner is performing well in mathematics) what do you think influence your good performance? (Family, teachers, friends…)

**Q12 to Q24: Predominantly behavioral pattern in mathematics classroom?**

11. Can you please write down for me on the piece of a paper in a proper order from the subject that learners behave well to the subject that learners do not behave well?
12. What did you observed that make you rank mathematics on that place?
13. Have your mathematics teacher ever complained about certain learners' behaviour in class?
14. Have some learners ever lied to your mathematics teacher by saying that they are going to the toilet but in reality they were:
    a) Bored with the lesson?
    b) The topic was too hard?
    c) Craving for a cigarette.
    d) What other excuses do learners give to their teachers in order to bunk mathematics lessons?
15. What behaviour about yourself are you finding difficult to put under control in mathematics classroom?
16. What kind of behaviour of other learners that makes it difficult of you to cope with mathematics?
17. Have you ever been present during mathematics lesson, and at the end of the lesson you feel that you learned nothing?
    a) If so what was happening in the classroom?
    b) How often does the same situation happen in your class?
18. Have you ever notice learners walking around the classroom for different reasons including to borrow stationary in mathematics class?
19. Have you ever notice learners talking to one another or whispering on topics that are not related to mathematics?
20. Have you ever notice learners making jokes and teasing a learner who fails to solve a sum or problem in mathematics?
21. Have you ever notice a learner smoking cigarette?
    a) Dagga?
    b) Drinking alcohol?
    c) Bringing muti before writing the mathematics examination?
22. Among all the type of behaviour you just mentioned so far which ones do most learners do?
23. Are there some of learners' misbehaviour that teacher takes seriously than others?

**Q25 to Q32: Learners' personal behavior in mathematics classroom?**

24. Have you ever notice learners distracted by a cell phone while mathematics lesson is going on?
    a) How many times has this happen to you?
25. Have you ever notice learners shouting or whistling in mathematics class?
    a) If (yes) what do you think they want to achieve?
26. Have you ever experienced some learners been aggressive to one another in mathematics class
    a) If (yes) what do you think trigger the situation?
27. Have you ever experienced some learners throwing objects to one another in mathematics class
    a) If (yes) what do you think was their intentions?
28. Have you ever experienced a learner shouting at the teacher or refusing to take instructions during mathematics lesson?
    a) If (yes) how did that action make you feel?
29. Have you ever been distracted during mathematics lessons?
30. Have ever been involved in the following during your mathematics lesson in Grade 10? State whether it is: "Always, most of the time, sometime, once in a while, never".
    a) Late
    b) Absent
    c) Bunking
    d) Involve (participating) in jokes
    e) Being talkative
    f) Borrowing stationary
    g) Throwing the object in the class
    h) Not doing class work
    i) Not completing homework
    j) Rude at the teacher
    k) Aggressive
    l) And not taking instructions from the teacher.
32. What would you like to see happening in your maths class so that you understand maths better?
    a) Teacher to explain better
    b) Learners to keep quiet during the lesson
    c) Needing more time to understand
    d) Needing basics in mathematics
    e) Needing quiet moment to do class work and homework

## APPENDIX B: Teachers' and HODs' questionnaire

General instructions **CODE :**_____

Please answer all questions using a tick (√).
This questionnaire has three sections
SECTION A: Questions about the general behaviour of the school
SECTION B: Questions related to learners' behavioural pattern in mathematics lesson
SECTION C:Questions related to teachers' challenges caused by learners' behaviour in mathematics

**SECTION A**

Please answer the questions related to the **general learners' behaviour in your school** based on your personal observation for a period of 6 months (January 2014 to June 2014)

Please use (√) to indicate the extent to which the type of learners' behaviour mentioned below happens in your school. Indicate your choice by choosing between "Most of the time, Sometimes, Rare or Never"

| | | Most of the time | Sometime | Rare | Never |
|---|---|---|---|---|---|
| 1. | Learners have a tendency of being late at school (at least 2 learners in class). | | | | |
| 2. | Learners have a tendency of being absent at school (at least 1 learner in class). | | | | |
| 3. | Learners have a tendency of bunking certain lessons (at least 2 learners in class). | | | | |
| 4. | Is there a level of rebelliousness at school among certain learners? By displaying the following behaviour: | | | | |
| 4.1. | There are a number of learners who smoke cigarette. | | | | |
| 4.2. | There are a number of learners who smoke dagga (marijuana) or abuse other drugs. | | | | |
| 4.3. | There are a number of learners who drink alcohol. | | | | |
| 4.4. | There are a number of learners who hitch-hike to come to school. | | | | |
| 4.5. | There are a number of learners who gamble including playing dice or betting for money. | | | | |
| 4.6. | Learners form cliques whereby mischievous activities are done. | | | | |
| 4.7. | There have been instances of serious fight among learners. | | | | |
| 4.8. | There are a number of learners who use vulgar language. | | | | |
| 4.9. | There have been incidents of consensual kissing between boys and girls | | | | |
| 4.10. | There have been acts of vandalism to school property by learners | | | | |
| 4.11. | There have been incidences of stabbing by learners | | | | |
| 4.12. | There have been incidences of shooting at school | | | | |
| 4.13. | Is there (iziSikhothane) behaviour among learners? Examples: Learners carrying shoe polish wax, township music group dance, wearing expensive and flashy cloths when learners are wearing civvies. | | | | |

**SECTION B**

Please answer the questions related to **learners' behavioral pattern in your mathematics classroom** based on your personal observation for a period of 6 months (January 2014 to June 2014).

Please use (√) to indicate the extent to which the type of learners' behaviour mentioned below happens in your mathematics classroom.

Indicate your choice by choosing between "Most of the time, Sometimes, Rare or Never"

| | | Most of the time | Sometime | Rare | Never |
|---|---|---|---|---|---|
| 1. | Learners take 5 to 10 minutes to settle in mathematics class. | | | | |
| 2. | Learners complete other subjects' class work during mathematics lessons. | | | | |
| 3. | Learners give different reasons to go out of the class. | | | | |
| 4. | Learners are involved in other academic activities during mathematics lessons | | | | |
| 5. | Learners are habitually late in mathematics class (at least 2 learners a week). | | | | |
| 6. | Learners do not complete mathematics homework. | | | | |
| 7. | Learners do not engage in an organized mathematics study group. | | | | |
| 8. | Learners are not utilizing quiet places in school to study (Practice) mathematics on their own. | | | | |
| 9. | Learners reluctantly attend extra mathematics lessons organised by the school. | | | | |
| 10. | During mathematics lesson a number of learners are busy with electronic gadgets. | | | | |
| 11. | Learners show a tendency of wasting time during mathematics lesson by doing the following | | | | |
| 11.1. | They start and participate in jokes | | | | |
| 11.2. | By being talkative | | | | |
| 11.3. | Starting an argument or provocations with a classmate. | | | | |
| 11.4. | Learners talk out of turns (at the same time) when the teacher asks a question during mathematics lesson | | | | |
| 11.5. | Learners have tendency to sit with their friends. | | | | |
| 11.6. | Some learners participate in mathematics lesson only to impress their classmates. | | | | |
| 11.7. | Learners ask irrelevant questions, and say annoying comments with the intention to slow down the lesson because they are not keeping up. | | | | |
| 11.8. | Learners do not bring correct stationary for mathematics even though they have them at home. | | | | |
| 11.9. | Learners do not bring correct stationary for mathematics so that they can be allowed to borrow these from other classes. | | | | |
| 11.10. | Learners have a tendency of writing notes and corrections than doing class work exercises and | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | homework. | | | | | |
| 11.11 | Learners are not willing to participate in classroom discussion even though they know the answer. | | | | | |
| 11.12. | Learners intentionally take more time to perform a simple task in mathematics with the intention to slow down the lesson. | | | | | |
| 12. | | | | | | |

## SECTION C

| | | Most of the time | Sometime | Rare | Never |
|---|---|---|---|---|---|
| 1. | Has a learner ever walked out of your mathematics lesson without your permission? | | | | |
| 2. | Has a learner ever refuse to take instruction from you? | | | | |
| 3. | Have you ever been involved in learner-teacher confrontation? | | | | |
| 4. | Have you ever been told by a learner that he has a right to behave in a certain way, while his or her action is disrupting the teaching and learning? | | | | |
| 5. | Have you ever felt under pressure to complete the syllabus because you wasted so much time in administering discipline to unruly learners? | | | | |
| 6. | Have you ever had an impression that learners do not grasp fully certain topics in mathematics because of time constraints? | | | | |
| 7. | Have you ever felt under pressure to complete the syllabus because you spend so much time with learners, helping them to grasp fully certain topic in mathematics? | | | | |
| 8. | I control learners' behaviour in my mathematics class by giving learners a private mild rebuke. | | | | |
| 9. | I control learners' behaviour in my mathematics by giving a learner a private strong rebuke | | | | |
| 10. | I control learners' behaviour in my mathematics class by stopping a lesson for a moment and staring at a disruptive learner. | | | | |
| 11. | I control learners' behaviour in my mathematics class by changing the class sitting arrangement. | | | | |
| 12. | I control learners' behaviour in my mathematics class by isolating disruptive learners. | | | | |
| 13. | I control learners' behaviour in my mathematics class by ignoring disruptive behaviour and focus on learners who are well behaved | | | | |
| 14. | I control learners' behaviour in my mathematics class by stopping the lesson for a moment and address a general class misbehaviour. | | | | |
| 15. | I control learners' behaviour in my mathematics class by rewarding learners with good behaviour with gifts, privileges and commendations. | | | | |
| 16. | I control learners' behaviour in my mathematics class by making a learner to stay after school to complete his/her mathematics class work under my supervision | | | | |
| 17. | I control learners' behaviour in my mathematics class by giving learners a warning letter. | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 18. | I control learners' behaviour in my mathematics class by calling the Grade head or the mathematics HOD to address a general class misbehaviour | | | | |
| 19. | As a mathematics teacher I get frustrated to the point of thinking to change my teaching career because of learners' misbehaviour. | | | | |
| 20. | As a teacher I get frustrated to the point of thinking to change my teaching career because of learners' poor performance in mathematics. | | | | |
| 21. | Other option: | | | | |
| 22. | | | | | |

## APPENDIX C: Document analysis for learners' assessment accumulated marks

| | CYCLE TEST | CLASS TEST 1 | CLASS TEST 2 | CYCLE TEST CONVERTED | CLASS TEST 1 CONVERTED | CLASS TEST 2 CONVERTED | TERM MARK (TERM ONE) | CLASS TEST | CONVERTED MARKS | PAPER 1 | PAPER 2 | CONVERTED P | TERM MARK (TERM TWO) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 60 | 50 | 60 | 75 | 25 | 25 | 100% | 50 | 25 | 100 | 100 | 75 | 100% |
| No. | | | | | | | | | | | | | |
| L1SA | 32 | 20 | 22 | 40 | 10 | 9 | 50 | 9 | 5 | 24 | 35 | 24 | 30 |
| L2 SA | 51 | 25 | 34 | 64 | 13 | 14 | 78 | 13 | 15 | 53 | 68 | 48 | 63 |
| L3 SA | 36 | 16 | 30 | 45 | 8 | 12 | 57 | 23 | 12 | 25 | 19 | 18 | 30 |
| L4 SA | 27 | 12 | 25 | 34 | 6 | 10 | 44 | 17 | 9 | 19 | 17 | 14 | 23 |
| L5 SA | 56 | 36 | 33 | 70 | 18 | 13 | 88 | 37 | 17 | 56 | 35 | 36 | 53 |
| L6 SA | 41 | 16 | 25 | 51 | 8 | 10 | 61 | 19 | 10 | 33 | 28 | 24 | 34 |
| L7 SA | 44 | 15 | 28 | 55 | 8 | 11 | 66 | 11 | 6 | 30 | 28 | 23 | 30 |
| L8 SA | 51 | 18 | 27 | 64 | 9 | 11 | 75 | 38 | 19 | 36 | 32 | 27 | 36 |
| L9 SA | 40 | 38 | 33 | 50 | 19 | 13 | 69 | 31 | 16 | 47 | 24 | 28 | 49 |
| L10 SA | 39 | 28 | 23 | 49 | 14 | 9 | 63 | 34 | 17 | 46 | 40 | 34 | 51 |
| L11 SA | 46 | 12 | 33 | 58 | 6 | 13 | 71 | 38 | 19 | 65 | 59 | 50 | 70 |
| L12 SA | 54 | 47 | 40 | 68 | 24 | 16 | 92 | 48 | 24 | 59 | 69 | 51 | 75 |
| L13 SA | 37 | 38 | 31 | 46 | 19 | 13 | 65 | 31 | 16 | 27 | 26 | 21 | 37 |
| L14 SA | 53 | 26 | 36 | 66 | 13 | 14 | 80 | 35 | 18 | 41 | 36 | 31 | 50 |
| L15 SA | 23 | 6 | 8 | 29 | 3 | 3 | 32 | 12 | 6 | 16 | 6 | 9 | 15 |
| L16 SA | 46 | 25 | 31 | 58 | 13 | 12 | 71 | 18 | 9 | 33 | 31 | 26 | 35 |
| L17 SA | 45 | 14 | 34 | 56 | 7 | 14 | 70 | 21 | 11 | 19 | 23 | 17 | 28 |
| L18 SA | 26 | 23 | 20 | 33 | 12 | 8 | 45 | 23 | 12 | 33 | 10 | 17 | 30 |
| L19 SA | 27 | 8 | 28 | 34 | 4 | 11 | 45 | 19 | 10 | 21 | 21 | 17 | 27 |
| L20 SA | 34 | 12 | 30 | 43 | 6 | 12 | 55 | 26 | 13 | 21 | 21 | 17 | 30 |
| L21 SA | 45 | 11 | 31 | 56 | 6 | 12 | 68 | 23 | 12 | 30 | 40 | 28 | 40 |
| L22 SA | 48 | 31 | 34 | 60 | 16 | 14 | 76 | 38 | 19 | 41 | 41 | 33 | 52 |
| L23 SA | 45 | 12 | 29 | 56 | 6 | 12 | 68 | 12 | 6 | 24 | 35 | 24 | 30 |
| L24 SA | 39 | 5 | 30 | 49 | 3 | 12 | 61 | 3 | 2 | 28 | 11 | 16 | 18 |
| L25 SA | 37 | 11 | 29 | 46 | 6 | 12 | 58 | 18 | 9 | 25 | 36 | 24 | 33 |
| L26 SA | 30 | 26 | 32 | 38 | 13 | 13 | 51 | 17 | 9 | 44 | 25 | 28 | 31 |
| L27 SA | 41 | 17 | 39 | 51 | 9 | 16 | 67 | 36 | 18 | 35 | 35 | 28 | 46 |
| L28 SA | 55 | 33 | 37 | 69 | 17 | 15 | 86 | 41 | 21 | 51 | 41 | 37 | 58 |
| L29 SA | 37 | 23 | 31 | 46 | 12 | 12 | 58 | 41 | 9 | 26 | 20 | 18 | 27 |
| L30 SA | 47 | 33 | 25 | 59 | 17 | 10 | 76 | 16 | 8 | 33 | 18 | 20 | 28 |
| L31 SA | 36 | 19 | 32 | 45 | 10 | 13 | 58 | 25 | 13 | 30 | 23 | 21 | 34 |
| L32 SA | 54 | 27 | 26 | 68 | 14 | 10 | 82 | 33 | 17 | 44 | 36 | 32 | 50 |
| L33 SA | 42 | 1 | 22 | 53 | 1 | 9 | 62 | 14 | 7 | 18 | 11 | 12 | 19 |
| L34 SA | 40 | 42 | 37 | 50 | 21 | 15 | 71 | 34 | 17 | 47 | 19 | 26 | 43 |
| L35 SA | 45 | 16 | 23 | 56 | 8 | 9 | 65 | 22 | 11 | 36 | 26 | 25 | 36 |
| L36 SA | 52 | 42 | 32 | 65 | 21 | 13 | 86 | 44 | 22 | 70 | 58 | 51 | 73 |
| L37 SA | 28 | 10 | 27 | 35 | 5 | 11 | 46 | 23 | 12 | 20 | 31 | 20 | 32 |
| L38 SA | 23 | 2 | 18 | 29 | 1 | 7 | 36 | 7 | 4 | 12 | 11 | 9 | 13 |
| L39 SA | 47 | 35 | 30 | 59 | 18 | 12 | 77 | 28 | 14 | 46 | 51 | 39 | 53 |
| L40 SA | 37 | 14 | 24 | 46 | 7 | 10 | 56 | 19 | 10 | 36 | 23 | 24 | 34 |
| L41 SA | 34 | 16 | 27 | 44 | 8 | 11 | 55 | 20 | 10 | 47 | 32 | 32 | 42 |
| L42 SA | 24 | 9 | 25 | 30 | 5 | 10 | 40 | 13 | 7 | 14 | 9 | 9 | 16 |
| L43 SA | 55 | 36 | 36 | 69 | 18 | 14 | 87 | 39 | 20 | 61 | 47 | 43 | 63 |
| L44 SA | 34 | 12 | 21 | 43 | 6 | 8 | 51 | 24 | 12 | 33 | 22 | 22 | 34 |
| L45 SA | 12 | 4 | 8 | 15 | 2 | 3 | 18 | 6 | 3 | 10 | 2 | 5 | 8 |
| L46 SA | 47 | 16 | 16 | 59 | 8 | 6 | 67 | 9 | 5 | 14 | 16 | 12 | 17 |
| L47 SA | 35 | 11 | 24 | 44 | 6 | 10 | 54 | 16 | 8 | 19 | 17 | 14 | 22 |
| L48 SA | 31 | 25 | 30 | 39 | 13 | 12 | 52 | 17 | 9 | 26 | 18 | 18 | 27 |
| L49 SA | 54 | 47 | 41 | 68 | 24 | 16 | 92 | 38 | 19 | 73 | 72 | 58 | 77 |
| L50 SA | 40 | 22 | 34 | 50 | 11 | 14 | 64 | 18 | 9 | 34 | 33 | 27 | 36 |
| L51 SA | 30 | 9 | 26 | 38 | 5 | 11 | 49 | 27 | 14 | 21 | 8 | 12 | 26 |
| L52 SA | 54 | 23 | 33 | 68 | 12 | 13 | 71 | 28 | 44 | 30 | 14 | 18 | 32 |
| L53 SA | 23 | 4 | 26 | 29 | 2 | 10 | 39 | 8 | 4 | 12 | 10 | 9 | 13 |
| L54 SA | 59 | 43 | 41 | 74 | 22 | 16 | 96 | 47 | 24 | 62 | 44 | 42 | 66 |

## APPENDIX D: Samples of transcribed, coded learners' interviews with themes

LEARNERS WERE ASKED TO ANSWER THE FOLLOWING QUESTION: *What would you like to see happening in your class so that you understand mathematics better?*

| | **LEARNERS STATEMENTS** |
|---|---|
| Learners codes in SA | |
| L11SA | If the teacher is explaining, he must explain better in a better way, not like in text book, explain the way he understands from his heart sir.<br>**FACTORS: TEACHER (way of teaching)** |
| L39SA | If everyone could be focused [0:1] and the jokes [1:5] shouldn't be there, listening to the instructions.<br>**FACTORS: (BEHAVIOUR concentration), (BEHAVIOUR disruptive)** |
| L22SA | I think if we can keep quiet, we will pay more attention and we all understand better; because when we are talking[1:1] we miss out the understanding the subject.<br>**FACTORS: (BEHAVIOUR disruptive)** |
| L50SA | If we can have more technology in mathematics lessons.<br>**FACTORS: MATHEMATICS AS A SUBJECT(needs technology)** |
| L29SA | if they take the people who don't behave outside or be taken in a different class Sir **FACTORS: (BEHAVIOUR disruptive)** |
| | **LEARNERS STATEMENTS** |
| Learners codes in SA | |
| L37SB | I just wish to see everyone participating, all of us doing the same thing instead of us doing different things.<br>**FACTORS: (BEHAVIOUR disruptive) (BEHAVIOUR concentration).** |
| L23SB | I wish to see everyone participating [0:1], and the noise should not be there.<br>**FACTORS: (BEHAVIOUR disruptive) (BEHAVIOUR concentration).** |
| L10SB | Because most of the class do not like him (the teacher), they disrupt [1:4] everyone, and at the end we don't listen.<br>**FACTORS: (BEHAVIOUR disruptive)** |
| L46SB | Pupils must keep quiet so that we learn, and only ask question when we do not understand<br>**FACTORS: (BEHAVIOUR disruptive).** |
| L20SB | To make maths in the first or second period because after that I get tired, even other learners they becor tired and they start to sleep.<br>**FACTORS: (BEHAVIOUR concentration)** |

LEARNERS WERE ASKED TO ANSWER THE FOLLOWING QUESTION: Which year and *How were your circumstances when you were passing mathematics?*

| | YEAR/GRADE | LEARNERS STATEMENTS |
|---|---|---|
| Learners codes in SA | | |
| L11SA | Last year sir, in Grade 9 I got a certificate it was 84% | My classmates motivated me, Sir. Also the teacher Sir. Now the teacher Sir! He is fine but him and I, we don't find that connection. **FACTORS: FRIENDS & FAMILY, TEACHER (way of teaching)** |
| L39SA | It was Grade 9, where I got 82% | But now I have dropped a lot. I think it is the bad choice of friends. I also think it is a lack of practice [0:3]. I use to practice every time when I got home, but now I don't practice a lot. **FACTORS: (BEHAVIOUR concentration)** |
| L22SA | In Grade 9 I was taught by a good teacher we use to get 80's and90's. | one of the reasons why I am failing it is because of the class in which I am in. last year and the year before we were in good class, everyone was focused, they knew what they wanted, so I think it because of that, and the teacher we had was very good learners would not take nonsense like making noise in the class [1:4]. **FACTORS: (BEHAVIOUR disruptive)** |
| L50SA | In Grade 7 I got around 90%. | Sometime is the teacher, and sometime is the learning environment [1:4]I find myself in often. **FACTORS: (BEHAVIOUR disruptive).** |
| L29SA | It was Grade 6, for the ANA I got 97%. | I think it is what happened at home that made me pass here at school. Now I have every everything I need, my own room, the financial status and the living circumstances of my family have improve, so I tend to relax about life, back then I did not have every think I need, that pushed me to have higher marks. **FACTORS: FRIENDS & FAMILY** |
| | | **LEARNERS STATEMENTS** |
| Learners codes in SA | | |
| L37SB | it was 98% when I was in Primary school | I was not being attentive [0:1] to the teacher who was teaching. But now as thing goes on things get difficult in mathematics, I started struggling in Mathematics. **FACTORS: (BEHAVIOUR concentration)** |
| L23SB | I use to get 80%and 60%. I was in Grade | I used to be in a group when I study, but last year and this year in Grade 9 and 10 I am stuck. **FACTORS: FRIENDS&FAMILY** |

| | | |
|---|---|---|
| | 8 | |
| L10SB | It was in Grade 8, I got around 60%. | I used to have good friends but now I have too much (many) friends, make it hard to listen in class [0:1], and noise[1:4] but me too I am into playing[1:2]; so we play together[1:2].<br>**FACTORS: (BEHAVIOUR concentration) (BEHAVIOUR disruptive)** |
| L46SB | I have never got above 70%since I started school | I was feeling good but not good all for my maths marks, I would like say, yes I pass but my marks were not good!!<br>**FACTORS: MATHEMATICS AS SUBJECTS (difficult)** |
| L20SB | Grade 6 and 7. I use to get 50% | When the teacher was teaching I use to sit down and listen [0:1]to him he made it clear and I get it; but in Grade 9 when I use to do that the teacher was shouting[1:4] and learners are playing[1:2].<br>**FACTORS: (BEHAVIOUR concentration), (BEHAVIOUR disruptive)** |

## APPENDIX E: Analysis of learners' classroom behaviour

| PPS & WPS LEARNER INTERVIEWS SCORES | | CLASSROOM BEHAVIOUR | CLASSROOM BEHAVIOUR | CLASSROOM BEHAVIOUR | CLASSROOM BEHAVIOUR | CLASSROOM BEHAVIOUR | CLASSROOM BEHAVIOUR | CLASSROOM BEHAVIOUR | CLASSROOM BEHAVIOUR | CLASSROOM BEHAVIOUR | CLASSROOM BEHAVIOUR | TOTAL FREQUENCY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CODE | FORMS OF MISBEHAVIOURS IN MATHS CLASS | L37 SB | L23 SB | L10 SB | L46 SB | L20 SB | L11 SA | L39 SA | L22 SA | L50 SA | L29 SA | |
| 0. | Concentration behaviour | 23 | 13 | 29 | 17 | 16 | 17 | 29 | 30 | 8 | 19 | 201 |
| 0:1 | Bored (lazy) being distracted, not attentive | √√√√ √√√√ √√√√ √√ | √√√√ √√ | √√√√ √√√√ √√√√ √ | √√√√ √√√√ √√ | √√√√ √√ | √√√√ √ | √√√√ √√√√ √√√√ √ | √√√√ √√√√ √√√√ √√√√ √ | √√√ | √√√√ √√ | 93 |
| 0:2 | Sleeping | | | √√√√ √√ | | √ | √√ | | √√√√ | | √√ | 15 |
| 0:3 | Not doing homework or class work | √√√√ | √√√√ √ | √√√√ | √√ | √√√√ | √√ | √√√√ | √√√√ | √ | √√√√ | 34 |
| 0:4 | Bunking lessons | √√ | √ | √√ | √√√√ √ | √√√√ | √√ | √√√√ √ | √ | √ | √√√ | 26 |
| 0:5 | Late | √√ | | √√√√ | | | √√√√ √ | √√√√ √ | √√ | √ | √ | 20 |
| 0:6 | Absent (Truancy) | √ | √ | √ | | √ | √ | √√ | √√ | √ | √√√ | 13 |
| 1. | Disruptive behaviour | 31 | 25 | 29 | 21 | 22 | 13 | 25 | 44 | 17 | 28 | 255 |
| 1:1 | Talkative | √√√√ √√√√ √√√√ √√√ | √√√√ √√√√ √√√ | √√√√ √√√√ √√√√ √√ | √√√√ √√√√ √ | √√√√ √√√√ | √√√√ | √√√√ √√√√ √√√√ √√ | √√√√ √√√√ √√√√ √√√√ √√√√ √ | √√√√ √√√√ | √√√√ √√√√ √√√√ √√√ | 123 |
| 1:2 | Playful (not serious) | √√√ | √√√ | √√√√ √ | √ | √√√√ √√√√ | √ | | √ | | | 22 |
| 1:3 | Doing other subjects in maths class | √ | √ | √√ | √√ | | | √√ | √√ | | √√ | 12 |
| 1:4 | Making noise (Shout, Disruption) | √√√√ | √√√√ √√√ | √√√√ √√√√ | √√ | √√ | √√√ | √√ | √√√√ √√√√ √ | √√√√ √ | √√√√ √√√√ | 50 |
| 1:5 | Starting and participating jokes | √√√√ √ | √√ | | √√ | √√√√ | √√√√ √ | √√√√ √ | √√√√ √ | √√√ | √√√ | 36 |
| 1:6 | Walking around the class | √√√ | √ | | √√√ | | | √√ | √√ | √ | | 12 |
| 2 | Anti-social behaviour | 13 | 1 | 5 | 6 | 15 | 6 | 6 | 8 | 0 | 10 | 70 |
| 2:1 | Insubordination (Arrogance) | √√ | √ | √√√√ | √√ | √√√√ | √ | √√√ | √ | | | 18 |
| 2:2 | Aggressive(whistling) Tsotsi language | √√√√ | | √ | √√√ | √√√ | √ | | √ | | √ | 14 |
| 2:3 | Gambling in class | | | | | √√√√ | | | | | | 4 |
| 2:4 | Smelling cigarette(Smoking) | √√ | | | | √√ | √ | √ | √√√ | | √ | 10 |
| 2:5 | Smelling liquor (Drinking) | √ | | | | | | √ | | | √ | 3 |
| 2:6 | Smelling dagga (Smoking) | √√ | | | √ | √√ | √√√ | √ | √ | | √√√√ √√ | 17 |
| 2:7 | Vandalism and throwing objects in the class | √√ | | | | | | | √√ | | | 4 |
| | TOTAL (SCORES) PER LEARNER | 67 | 39 | 63 | 44 | 53 | 36 | 60 | 82 | 25 | 57 | 526 |

## APPENDIX F: Informed consent letter to the principals of the school

Franco Hagoramagara

082 676 8126

hagoramagarafranco@yahoo.com

Dear Sir/Madam

Subject: Request to conduct research in your schools

My name is Franco Hagoramagara. I am a student at the University of South Africa and am presently enrolled for master's degree in education with a specialization in mathematics. In order to complete the requirements for the degree, I have to become acquainted with aspects of doing research that will involve Grade 10 mathematics learners in your school. My research will focus on investigating how learners' behaviour during mathematics lesson impact on their academics in Johannesburg east district. The title of my research is, *"The impact of Grade 10 learners' behaviour on their academic performance in mathematics".* My research supervisor is Dr Joseph Dhlamini who is a Mathematics Education lecturer at the University of South Africa. The purpose of this research is to improve learners' performance in mathematics in Johannesburg East district. I wish to invite you to participate in this research.

If you agree to participate in this research you will be requested to avail 2 Grade 10 mathematics educators to complete a questionnaire that will address some aspects general observations on learners' behaviour of grade 10 mathematics in your school for the past six months (from January 2014 to June 2014). Also, through mathematics school HoD (Head of Department) you will be asked to avail Grade 10 mathematics working mark sheet for the period January 15, 2014 till the June 30, 2014, as this will allow the researcher to sample the right candidates to participate in the interviews. In order to gain insight into learners' predominant behaviour patterns that exist in mathematics classrooms you will be requested to allow 4 Grade 10 mathematics learners in your school to participate in the interviews. This information will assist us to correlate particular type of learners' behaviour and the impact it has on their performance in mathematics. All interviews will be audio-recorded to assist me to capture all information accurately. Recorded interviews will be transcribed by me and I will come back to you to verify if the information is accurately represented.

The identity of all participants, and that of your school, will not be revealed. In reporting about the findings from this research pseudonyms will be used. In the end, the results of the study will be made available to you and to your school. All activities related to this research will be conducted with great courtesy; to insure that the research does not interfere with teaching and learning, all activities will take place after school 14h00 to 15h00. Participants in completing questionnaires will be given a timeframe of a week to complete a 30 minutes questionnaire. In order to put learners at ease, the interviews with learners will be on one to one basis at an open place and it will last for 45 to 60 minutes. Prior to the commencement of the research the researcher will convene a meeting with all participants to explain the objectives of the study and clarify other related issues. Should you decide to participate in the study, you are free to withdraw your participation at any stage of the research without a penalty. After reading this letter, please complete the attached consent form and return to the researcher.

I thank you in advance for reading this letter and I hope to hear from you soon. If you have questions about this research you are free to call me at 082 676 8126, or send me an email at hagoramagarafranco@yahoo.com.

Yours faithfully
Mr Franco Hagoramagara
Signature: _____

## APPENDIX G: Informed consent letter to the HODs

Franco Hagoramagara

082 676 8126

hagoramagarafranco@yahoo.com

Dear Sir/ Madam

Subject: Request to conduct research in your schools

My name is Franco Hagoramagara. I am a student at the University of South Africa and am presently enrolled for master's degree in education with a specialization in mathematics. In order to complete the requirements for the degree, I have to become acquainted with aspects of doing research that will involve Grade 10 mathematics learners in your school. My research will focus on investigating how learners' behaviour during mathematics lesson impact on their academics in Johannesburg east district. The title of my research is, *"The impact of Grade 10 learners' behaviour on their academic performance in mathematics".* My research supervisor is Dr Joseph Dhlamini who is a Mathematics Education lecturer at the University of South Africa. The purpose of this research is to improve learners' performance in mathematics in Johannesburg East district. I wish to invite you to participate in this research.

If you agree to participate in this research you will be requested to avail yourself to complete a questionnaire that will address some aspects general observations on learners' behaviour of grade 10 mathematics in your school for the past six months (from January 2014 to June 2014). Also, as a mathematics school HoD (Head of Department) you will be asked to avail Grade 10 mathematics working mark sheet for the period January 15, 2014 till the June 30, 2014, as this will allow the researcher to sample the right candidates to participate in the interviews. In order to gain insight into learners' predominant behaviour patterns that exist in mathematics classrooms you will be requested to allow 4 Grade 10 mathematics learners in your school to participate in the interviews. This information will assist us to correlate particular type of learners' behaviour and the impact it has on their performance in mathematics. All interviews will be audio-recorded to assist me to capture all information accurately. Recorded interviews will be transcribed by me and I will come back to you to verify if the information is accurately represented.

The identity of all participants, and that of your school, will not be revealed. In reporting about the findings from this research pseudonyms will be used. In the end, the results of the study will be made available to you and to your school. All activities related to this research will be conducted with great courtesy; to insure that the research does not interfere with teaching and learning, all activities will take place after school 14h00 to 15h00. Participants in completing questionnaires will be given a timeframe of a week to complete a 30 minutes questionnaire. In order to put learners at ease, the interviews with learners will be on one to one basis at an open place and it will last for 45 to 60 minutes. Prior to the commencement of the research the researcher will convene a meeting with all participants to explain the objectives of the study and clarify other related issues. Should you decide to participate in the study, you are free to withdraw your participation at any stage of the research without a penalty.
After reading this letter, please complete the attached consent form and return to the researcher.

I thank you in advance for reading this letter and I hope to hear from you soon. If you have questions about this research you are free to call me at 082 676 8126, or send me an email at hagoramagarafranco@yahoo.com.

I hope my request will be considered favourably.

Yours faithfully
Mr. Franco Hagoramagara

Signature: _____

## APPENDIX H: Informed consent letter to Grade 10 mathematics teachers

Franco Hagoramagara
082 676 8126
hagoramagarafranco@yahoo.com

Dear Sir/ Madam
Subject: Request to conduct research in your schools

My name is Franco Hagoramagara. I am a student at the University of South Africa and am presently enrolled for master's degree in education with a specialization in mathematics. In order to complete the requirements for the degree, I have to become acquainted with aspects of doing research that will involve Grade 10 mathematics learners in your school. My research will focus on investigating how learners' behaviour during mathematics lesson impact on their academics in Johannesburg east district. The title of my research is, *"The impact of Grade 10 learners' behaviour on their academic performance in mathematics".* My research supervisor is Dr Joseph Dhlamini who is a Mathematics Education lecturer at the University of South Africa. The purpose of this research is to improve learners' performance in mathematics in Johannesburg East district. I wish to invite you to participate in this research.

If you agree to participate in this research you will be requested to avail yourself to complete a questionnaire that will address some aspects general observations on learners' behaviour of grade 10 mathematics in your school for the past six months (from January 2014 to June 2014). Also, as mathematics educator you will be asked to avail Grade 10 mathematics working mark sheet for the period January 15, 2014 till the June 30, 2014, as this will allow the researcher to sample the right candidates to participate in the interviews. In order to gain insight into learners' predominant behaviour patterns that exist in mathematics classrooms you will be requested to allow 4 Grade 10 mathematics learners in your school to participate in the interviews. This information will assist us to correlate particular type of learners' behaviour and the impact it has on their performance in mathematics. All interviews will be audio-recorded to assist me to capture all information accurately. Recorded interviews will be transcribed by me and I will come back to you to verify if the information is accurately represented.

The identity of all participants, and that of your school, will not be revealed. In reporting about the findings from this research pseudonyms will be used. In the end, the results of the study will be made available to you and to your school. All activities related to this research will be conducted with great courtesy; to insure that the research does not interfere with teaching and learning, all activities will take place after school 14h00 to 15h00. Participants in completing questionnaires will be given a timeframe of a week to complete a 30 minutes questionnaire. In order to put learners at ease, the interviews with learners will be on one to one basis at an open place and it will last for 45 to 60 minutes. Prior to the commencement of the research the researcher will convene a meeting with all participants to explain the objectives of the study and clarify other related issues. Should you decide to participate in the study, you are free to withdraw your participation at any stage of the research without a penalty.

After reading this letter, please complete the attached consent form and return to the researcher. I thank you in advance for reading this letter and I hope to hear from you soon. If you have questions about this research you are free to call me at 082 676 8126, or send me an email at hagoramagarafranco@yahoo.com.

I hope my request will be considered favorably.

Yours faithfully

Mr. Franco Hagoramagara
Signature: _____

**APPENDIX I: Informed consent letter to parent/ guardian**

Franco Hagoramagara
082 676 8126
hagoramagarafranco@yahoo.com

Dear Sir/Madam

Subject: Consent to the parents/Guardians to allow their children to participate in a research.

I am registered with UNISA as a master's student in the Education Department. My research proposal has been approved by the Research and Publications Committee of Unisa.

My supervisor is Doctor J.J. Dhlamini and the topic is 'The impact of Grade 10 learners' behaviour on their performance in mathematics'. The purpose of this research is to improve learners' performance in mathematics in Johannesburg East district. I wish to request permission from you the Parents/Guardians to interview your child at schools as part of my research study. After reading this letter, please complete the attached consent form and return to the researcher. Thank you for reading this letter and I hope to hear from you soon.

If you have questions about I thank you in advance this research you are free to call me at 0826768126, or send me an email at hagoramagarafranco@yahoo.com.
I hope my request will be considered favourably.

Yours faithfully
Franco Hagoramagara

## APPENDIX J: Example of informed assent form to Grade 10 learners

Franco Hagoramagara
082 676 8126
hagoramagarafranco@yahoo.com

Dear learner

**Subject: Assent letter to the learner**

My name is Franco Hagoramagara and I am registered with the University of South Africa (UNISA) as a master's student in the Department of Mathematics Education. My supervisor is Dr Joseph Dhlamini from the Department of Mathematics Education. I am doing a research with the topic: *The impact of Grade 10 learners' behaviour on their academic performance in mathematics.* In this research I am looking into the relationship between children's mathematics performance in grade 10 and their behaviour during mathematics lessons in the same class. I plan to study children's behaviour over a period from January 2014 to June 2014, as well as their behaviour in mathematics lessons over the same period of time. If I find a connection, this will help teachers and those who design the curriculum to design strategies to help children to behave in a manner to improve their performance in mathematics. The main aim is to improve the performance of our children in our schools. You will realize that this is a good research and I wish that you become part of it.

In case you agree to participate in this research, I will study your mathematics performance and behaviour over a period from January to June 2014. I may also request you to answer some of the questions in an interview, which will last between 15 and 20 minutes. The participation in this research is voluntary, and you will be allowed to withdraw your participation at any stage of the research, if deemed necessary. There are no rewards or incentives if you choose to participate, and also, no penalty will be instituted to you if you choose not to participate in this research. Your name and that of your school will not be used in this research. If you have questions about I thank you in advance this research you are free to call me at 0826768126, or send me an email at hagoramagarafranco@yahoo.com.

I hope my request will be considered favourably.
Yours faithfully

Franco Hagoramagara
Signature: _____

**APPENDIX K: GDE research approval/ permission letter**

**GAUTENG PROVINCE**
Department: Education
REPUBLIC OF SOUTH AFRICA

**For administrative use:**
**Reference no. D2015/023**

# GDE RESEARCH APPROVAL LETTER

| | |
|---|---|
| **Date:** | **16 April 2014** |
| **Validity of Research Approval:** | **16 April 2014 to 03 October 2014** |
| **Name of Researcher:** | **Hagoramagara F** |
| **Address of Researcher:** | **8 Beryl Court** |
| | **24 Pretoria and beelaert Street** |
| | **Troyeville** |
| | **JHB** |
| | **2094** |
| **Telephone Number:** | **082 676 8126** |
| **Email address:** | **hagoramagarafranco@yahoo.com** |
| **Research Topic:** | **The impact of Grade 10 learners' behaviour on the performance in mathematics** |
| **Number and type of schools:** | **Two Secondary Schools** |
| **District/s/HO** | **Johannesburg East** |

## *Re: Approval in Respect of Request to Conduct Research*

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

Makhado
2014/04/16

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





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

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

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

Kind regards

.....

Dr David Makhado
Director: Education Research and Knowledge Management

DATE: 2014/04/16



***Making education a societal priority***

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

## APPENDIX L: Ethical clearance certificate from UNISA

UNISA | college of education

# Research Ethics Clearance Certificate

This is to certify that the application for ethical clearance submitted by

**F Hagoramagara [53734106]**

for a M Ed study entitled

**The impact of Grade 10 learners' behaviour on their performance in mathematics**

has met the ethical requirements as specified by the University of South Africa College of Education Research Ethics Committee. This certificate is valid for two years from the date of issue.

Prof KP Dzvimbo
Executive Dean : CEDU

Dr M Claassens
CEDU REC (Chairperson)
mcdtc@nctactive.co.za

Reference number: 2014 MAY /53734106/MC

19 MAY 2014

**APPENDIX M: Editing certificate**

# TO WHOM IT MAY CONCERN

As an experienced professional editor, I, Elizabeth Hain Stewart, have edited the research proposal of Franco Hagoramagara titled 'The impact of Grade 10 learners' behaviour on their academic performance in mathematics'. In doing so, I have applied the conventions of proper English language usage, punctuation and spelling, and have amended errors in concord and syntax. The contents of the thesis, however, are entirely the student's concern and at no stage have I exceeded my remit and encroached on content, the author's voice or his style of writing.

Elizabeth Hain Stewart

Date 3 June 2015

Former English editor at Unisa Press
Full member Professional Editors' Group, South Africa
Active member of Linked-In professional editing groups and online Copy-editing List, Indiana University

Tel 012 807 7030
082 557 2924
Email liz.stewart@lantic.net

## APPENDIX N: Proof of registration

UNISA university of south africa

0025

MAGOBANABANA P MR
[redacted]

STUDENT NUMBER : 5373-410-6

ENQUIRIES TEL : 0861 670 411
FAX : (012) 429-4150
eMAIL : ssacdd@unisa.ac.za

2015-06-08

Dear Student

I hereby confirm that you have been registered for the current academic year as follows:

Proposed Qualification: NED (MATHS EDUC) (98446)

| CODE | PAPER | M | MARK BY STUDY UNIT | WEIGHT | LANG. | PROVISIONAL EXAM.DATE | EXAMINATION CENTRE(PLACE) |
|---|---|---|---|---|---|---|---|
| Study units registered without formal names: | | | | | | | |
| DFNED85 | | NED | MATHEMATICS EDUCATION (DISSERTATION) | 0.387 | E | | |

You are referred to the "MyRegistration" brochure regarding fees that are forfeited on cancellation of any study units.

BALANCE ON STUDY ACCOUNT: 0.00

Yours faithfully,

Prof QN Tshabe
Registrar (Acting)

0'08 0 E0 0

UNIVERSITEIT VAN SUID-AFRIKA
PRETORIA
UNIVERSITY OF SOUTH AFRICA

University of South Africa
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