

**AN EXPLORATION OF THE COMPREHENSION AND IMPLEMENTATION OF
ASSESSMENT FOR LEARNING BY SELECTED PRIMARY SCHOOL
MATHEMATICS TEACHERS**

NEWTON BHEKISISA MVELASE
SPTD, FDE, B.ED HONS

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Supervisor: Prof. BJJ Lombard

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DECLARATION

I, NEWTON BHEKISISA MVELASE, solemnly declare this dissertation entitled: AN EXPLORATION OF THE COMPREHENSION AND IMPLEMENTATION OF ASSESSMENT FOR LEARNING BY SELECTED PRIMARY SCHOOL MATHEMATICS TEACHERS is original and the result of my own work. It has never, on any previous occasion, been presented in part or whole to any institution or Board for the award of any degree. I further declare that all information used and quoted has been duly acknowledged by means of complete reference.

Signature: _____

Date: _____

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SUMMARY

Title: An exploration of the comprehension and implementation of Assessment for Learning by selected primary school Mathematics teachers

Key words: assessment, formative assessment, assessment for learning, learning intentions, feedback, questioning, self- and peer assessment, learner performance, Mathematical improvement, Mathematics classrooms.

In 2006 the Gauteng Department of Basic Education (GDoBE) launched a pilot project to introduce Assessment *for* Learning (AfL). This initiative was prompted by learners' poor performance; especially in subjects such as Mathematics and English. The AfL project was introduced in selected primary and secondary schools. Grade 5 teachers for all subjects and Grade 10 teachers for all subjects within selected primary and secondary schools formed part of the pilot project. These teachers were oriented and introduced to AfL, after which workshops to strengthen teachers' understanding and skills of AfL were conducted. Lead educators (District Learning Area facilitators or Subject Advisors), were required to monitor and support participating schools and teachers in implementing AfL.

Based on a literature and empirical study, the researcher explored the comprehension and implementation of AfL by selected primary school Mathematics teachers that participated in the AfL pilot project of the GDoBE. The empirical study was approached by means of a qualitative research design in the form of a multiple case study. Individual interviews, observations and focus group interviews were used to collect data from purposive selected teachers from three Gauteng Districts (Johannesburg West, Johannesburg North and Ekurhuleni South). Both Township and ex-Model C primary schools were included in the study and eventually a total of 11 Mathematics teachers from these schools participated in the study.

The research results revealed that the sampled teachers' comprehension of AfL can be rated as satisfactory since they realise its potential in terms of learning and learner development. Moreover, these teachers show an awareness of the relation between formative (AfL) and summative assessment (assessment *of* learning (AoL)). With regard to its implementation, it is clear that a lack of support from

colleagues, School Management Teams (SMTs) and District officials impede on the successful implementation of AfL. Other factors hampering the implementation of AfL include time constraints, uncertainty about appropriate resources and the simultaneous implementation of the Curriculum and Assessment Policy Statements (CAPS) and the Gauteng Primary Literacy Mathematics Strategy (GPLMS). It is further noted that the elements of AfL, which includes the sharing of learning intentions, questioning, feedback and peer and self-assessment, are all mediocrely implemented.

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CHAPTER ONE

INTRODUCTION AND MOTIVATION OF THE STUDY

1.1 INTRODUCTION AND PROBLEM STATEMENT

Black and Wiliam (1998a:140) suggest that learning is driven by what teachers and learners do in the classroom. In this regard assessment in education must, first and foremost, serve the purpose of supporting learning (Black and Wiliam, 2006:9). Hence, it is argued that teaching, learning and assessment should not exist in separate vacuums; in fact assessment should form an integral part of teaching and learning (Grosser & Lombard, 2005:42; Mweemba & Chilala, 2007:31). Assessment is thus seen as one of the most powerful educational tools for promoting effective learning (Assessment Reform Group, 1999:2). However, if assessment is not functionally employed in the classroom, the power of assessment is diminished (Stiggins, 1999:23).

In recent years the introduction of Outcomes-based Education (OBE) in South African education has changed many curriculum implementation practices, including that of assessment, to be more learner-centred and less teacher-centred (Marnewick & Rouhani, 2006:268). Assessment, in the context of OBE (and beyond), is described as an on-going process of gathering valid and reliable information (evidence) about learners' performance against clearly defined criteria by using a variety of methods, tools and techniques in different contexts (DoE, 2002a:77; DoE, 2005:5). It is also stated that assessment can be used for a variety of reasons such as individual growth, learner development and the promotion of learners (DoE, 2002a:77; DoE, 2005:5).

Formative assessment, also referred to as assessment **for** learning (AfL) (Clarke, 2001:10; Stiggins, 2005:327; Lee, 2006:43; Harlen, 2007:50), is supposed to take place during teaching and learning and should aim to inform the learning experience for each learner, while summative assessment takes place at the end of a learning experience (Stiggins, 2005:326; Harlen, 2006:103; Marnewick & Rouhani, 2006:269). Blanchard (2009:139) emphasises that formative assessment is the making of judgments about how to take learners' learning forward, meaning that it forms part of the learning process; hence it is process-oriented, whereas summative

assessment is product-oriented. Since AfL encapsulates assessment which is designed and practiced to promote learning, its primary focus is to provide information which teachers and learners can use to assess themselves and one another (Black, Harrison, Lee, Marshall & Wiliam, 2004:10).

In 2006, the Gauteng Department of Basic Education (GDoBE) launched a pilot project on AfL (GDE, 2006). This initiative was prompted by studies in assessment, such as the “Third International Mathematics and Science Study” (TIMSS) (Martin, 1996), the “Progress in International Reading Literacy Study” (PIRLS) International 2006 Report (Mullis, Martin, Kennedy & Foy, 2007), and the study by “The Southern Africa Consortium for Monitoring Educational Quality” (SACMEQ) (Ross, Saito, Dolata, Ikeda, Postlethwaite & Griffin, 2006). All these studies revealed that South African learners are performing poorly in especially Mathematics and English. The way in which assessment is practiced in South African classrooms was thus not ruled out as a possible contributing factor impeding on learners’ poor performance. As part of the pilot project, the GDoBE introduced AfL in selected primary and secondary schools in the Gauteng Province. In primary schools, Grade 5 teachers for all Learning Areas (subjects), and in secondary schools, Grade 10 teachers for all subjects within selected schools formed part of the pilot project. These teachers were first oriented and introduced to AfL after which workshops to strengthen teachers’ understanding and skills of AfL were conducted on pre-determined Wednesdays after school hours. Over and above their normal duties, Lead Educators (District Learning Area or Subject facilitators) were required to monitor and support participating schools and teachers in implementing AfL to guide their classroom practice (GDE, 2006).

Given the assertions that AfL could improve learner performance (*cf.* Black & Wiliam, 1998a) and the ensuing attempt by the GDoBE to implement it, Stiggins (2002:761) maintains that a much stronger investment should be made in AfL. This deduction is underscored by the conclusion of the “Centre for Educational Research and Innovation” (CERI) (2008:10), pointing to the fact that the most visible assessment in schools is summative in nature, while little formative assessment is practiced. Locally, research by Warnich (2007) and Reyneke (2008) also highlighted teachers’ apparent reluctant use of assessment **for** learning.

1.2 PURPOSE STATEMENT

As the abovementioned drew attention to the fact that despite scholarly optimism about AfL, and its apparent unfavourable introduction in schools, the researcher was interested in determining the viability and sustainability of the GDoBE assessment **for** learning pilot project initiative. For this reason, the purpose of this proposed qualitative research was to explore the comprehension and implementation of AfL by selected Gauteng primary school Mathematics teachers that participated in the AfL pilot project of the Gauteng Department of Basic Education.

1.3 RESEARCH QUESTIONS

Based on the aforementioned purpose statement, the study was guided by a range of research questions.

1.3.1 Primary research question

The primary research question of the study was delineated as follows:

To what extent is assessment *for* learning comprehended and implemented by selected Gauteng primary school Mathematics teachers?

1.3.2 Secondary research questions and objectives of the study

Emanating from the primary research question, the following secondary research questions were formulated.

- How is assessment **for** learning defined and characterized within the context of educational assessment?
- How is assessment **for** learning justified in terms of learning and learner achievement?
- How is Mathematics as subject positioned within the South African school curriculum?
- How is assessment **for** learning comprehended by selected Gauteng primary school Mathematics teachers?
- To what extent is assessment **for** learning implemented by selected Gauteng primary school Mathematics teachers?

Following the respective secondary research questions, the related objectives of the study were expressed as follows:

- To define and characterize assessment **for** learning within the context of educational assessment.
- To justify assessment **for** learning in terms of learning and learner achievement.
- To determine how Mathematics as subject is positioned within the South African school curriculum.
- To explore how assessment **for** learning is comprehended by selected Gauteng primary school Mathematics teachers.
- To explore the extent to which assessment **for** learning is implemented by selected Gauteng primary school Mathematics teachers.

1.4 CONCEPTUAL FRAMEWORK

Though this study was primarily founded on AfL, it was also positioned within the Mathematics classroom environment. For this reason *assessment*, and more particularly *assessment for learning*, as well as *Mathematics* as school subject formed the focal points of the study.

1.4.1 Assessment

Assessment is fundamental to teaching and learning. One of the outstanding features of assessment in recent years has been the shift in the focus of attention from summative assessment to formative assessment. At present there is a greater interest in the interaction between assessment and classroom teaching and learning (assessment **for** learning) and a move away from the concentration on the properties of restricted forms of assessment which are only weakly linked to the learning experience of learners (assessment **of** learning) (Black & Wiliam, 1998b:1; Botha, Fourie & Geyser, 2005:60).

As indicated earlier, the most visible assessment in schools is summative in nature (*cf.* 1.1). Summative assessment is primarily used to measure what learners have learnt at the end of a learning experience or to promote learners. According to Black and Wiliam (1998b:1) and the Centre for Education Research and Innovation (CERI) (2008:1), assessment can also serve a formative purpose which implies that

assessment is done on a frequent, interactive manner in order to assess learners' progress and understanding and to identify their learning needs. Consequently, formative assessment also informs teachers about their teaching and enables them to adjust how they teach. The Department of Education (DoE) (2002b:16) regards summative and formative assessment as continuous assessment and declares that it should be used to monitor learners' progress and to form part of active learning. As a result, summative and formative assessment should be distinguished but should, ideally speaking, not be treated as separate activities.

1.4.2 Assessment *for* learning

Assessment *for* learning is often also referred to as formative assessment (Dreyer, 2008:23). It forms part of teaching and learning and includes activities which keenly involve learners and promote classroom discussion and interaction. It can be described as the process of seeking and interpreting evidence for use by teachers and their learners to decide where the learners are in their learning, where to go to next and how best to get there (Stiggings, 2005:1; Cre'vola, Hill & Fullan, 2006:10). Considering the aforesaid, it can be inferred that the notion of AfL harmonises perfectly with Vygotsky's (1978) vision of constructivist and scaffold learning. Furthermore, AfL can be divided into four elements. These are: sharing learning intentions, constructive feedback, effective verbal questioning and self and peer assessment (Clarke, 2001:19; Black *et al.*, 2004:11; Lee, 2006:44). These elements were discussed in more detail in the subsequent chapter.

1.4.3 Mathematics

Mathematics is a compulsory subject throughout the South African school curriculum, whether it is referred to as *Numeracy* (under the National Curriculum Statements: Grades R-3 until the end of 2011) or *Mathematics* (under the Curriculum and Assessment Policy Statements: Grades R-3 since 2012), *Mathematics* (Grades 4-12) or *Mathematical Literacy* (Grades 10-12). According to the Curriculum and Assessment Policy Statement (CAPS) for Mathematics in the Further Education and Training band (FET) (DoBE, 2011a:10), Mathematics is envisaged as a subject that helps learners to develop mental processes by enhancing their logical and critical thinking, accuracy and problem solving skills that will eventually contribute to better decision-making skills. Yet, Mathematics has always been perceived as one of the

most difficult subjects in the school curriculum. This could be due to a variety of reasons which include different perceptions of Mathematics. In this regard, research by Webb and Webb (2004:13-14) suggests that teachers perceive Mathematics either as an absolute fixed body of knowledge and skills or as an imperfect and flexible discipline, while many learners regard Mathematics as a subject to be memorized. Another possible reason why Mathematics is labelled as being difficult can be related to the fact that many learners do not believe in their own mathematical abilities (Dednam, 2005:200). Van de Walle, Karp and Bay-Williams (2010:47) underscore this view by indicating that it is important for learners to have confidence in their abilities to do Mathematics.

1.5 RESEARCH METHODOLOGY

1.5.1 Research paradigm

According to Schwandt (2003:294), Positivism, Interpretivism and Pragmatism are three different perspectives from which human action can be viewed and understood. This study was philosophically founded on Interpretivism, since it focused on gathering empirical data in the form of qualitative research. Maree and Van der Westhuizen (2007:31-32) maintain that when knowledge is seen as multi-faceted and subjective, the interpretive stance is usually pursued. The study's adoption of the interpretivist perspective helped the researcher to reach multiple understandings and thus multiple conclusions (Maree & van der Westhuizen, 2007:37) through qualitative data collection and analysis about the comprehension and implementation of AfL by selected Gauteng primary school Mathematics teachers.

1.5.2 Research design

The study comprised of a literature study and an empirical study.

1.5.2.1 Literature study

An extensive literature study covered the focus of the research topic. For this purpose national and international literature were accessed and a wide variety of primary and secondary sources such as books, journals, dissertations and theses, conference papers and official documents were consulted. Databases, which

included amongst others, catalogues of South African and International University libraries and the World Wide Web, EBSCOHost, ERIC, ETD and SABINET were used to gather information on the following keywords:

Assessment, formative assessment, assessment for learning, learning intentions, feedback, questioning, self and peer assessment, learner performance, improvement in Mathematics, Mathematics classrooms.

1.5.2.2 Empirical study

The empirical study is outlined below and covers the empirical research design, the strategy of inquiry, the population and sampling, data collection methods, quality criteria, the role of the researcher, ethical considerations and the data collection process.

1.5.2.2.1 Empirical research design

Creswell (2003:3) states that neither quantitative nor qualitative research methods are better than the other, but that both have their strengths and weaknesses. Because of the nature of the research purpose, the researcher was convinced that a qualitative research design was the most appropriate to investigate the primary research question. McMillan and Schumacher (2006:26) differentiate between interactive and non-interactive qualitative research designs. Whereas an interactive design is primarily concerned with face-to-face techniques to collect data from people in their natural settings, the researcher regarded it as the most appropriate for this study.

1.5.2.2.2 The strategy of inquiry

A strategy of inquiry or a research method is a type of qualitative, quantitative, or mixed methods design or model “that provides specific direction for procedures in a research design” (Creswell, 2009:11).

In the case of this study, the researcher wanted to obtain information to explore and come to an understanding of the comprehension and implementation of AfL by selected Gauteng primary school Mathematics teachers without manipulating any conditions that may affect the outcome of the results. The researcher therefore decided on a case study as strategy of inquiry because it permitted the researcher

an opportunity to examine individuals and events in-depth (Leedy & Ormrod, 2005:135). The researcher made use of a multiple case study (McMillan & Schumacher, 2006:135) since Grade 5 Mathematics primary school teachers from different contexts (ex-Model C and Township schools) formed part of the study.

1.5.2.2.3 The population and sampling

Teachers teaching Mathematics in Grade 5 in the primary schools who participated in the pilot project on AfL organized by the GDoBE embodied the population.

Since the researcher was based as Coordinator (Systemic Evaluation) in the Head Office of the GDoBE at the time of the study (*cf.* 2.5), conducting the study within districts closest to the researcher's office alleviated any possible financial and accessibility restrictions. It was therefore decided that non-probability, convenience sampling (Maree & Pietersen, 2007:177) would be the most appropriate for selecting the Johannesburg-West, Johannesburg-North and Ekurhuleni-South districts for conducting the research. Though it was acknowledged that this type of sampling did not guarantee representativeness of a population, it allowed for the accommodation of a population which was easily and conveniently available (Maree & Pietersen, 2007:177). Primary schools in the three districts that participated in the pilot project on AfL organized by the GDoBE were purposively sampled (McMillan & Schumacher, 2006:126; Maree & Pietersen, 2007:178). By considering all the relevant ex-Model C as well as Township primary schools in the three districts, a total number of six schools (four ex-Model C schools and two Township schools) were identified to be part of the research. Teachers, teaching Grade 5 Mathematics in the selected schools who were included in the pilot project, were also purposively sampled as research participants. Eleven teachers (six teaching in ex-Model C schools and five teaching in Township schools) were identified to be individually interviewed and observed. With regard to the focus group interviews, one school from each type (ex-Model C or Township) with the most teachers involved in the research was purposively identified. Three teachers of each of the two types of schools participated in the focus group interviews.

1.5.2.2.4 Data collection methods

Data collection methods in the form of individual interviews, observations and focus group interviews were used to obtain data relevant to the purpose of the research.

Eleven individual, face-to-face interviews were conducted to acquire information from the research participants. Semi-structured questions were prepared beforehand to ensure consistency. The duration of these interviews was limited to between 20 and 30 minutes and took place after school hours. The data obtained through the individual interviews were supplemented by structured observations of one lesson each of the 11 research participants. By acting as observer as participant, the researcher took anecdotal records (Nieuwenhuis, 2012a:85) during the observations to clarify the pre-determined elements suggested for observation. The individual interviews and observations focused primarily on the research participants' implementation of AfL. Two focus group interviews in which three teachers from each of the two types of schools participated (n=6), were also conducted. The focus group interviews afforded the researcher the opportunity for comparing research participants' shared views and to gain an in-depth view which was not attainable through the individual interviews or observations (Nieuwenhuis, 2012a:90) on the research participants' comprehension of AfL. These interviews lasted between 20 and 30 minutes and were also conducted after school hours. Both types of interviews were tape-recorded for the purposes of analysis and interpretation.

1.5.2.2.5 Quality criteria

Golafshani (2003:602) indicates that research always requires rigorous procedures for ensuring its quality. In this regard Nieuwenhuis (2007:113) notes that *trustworthiness* is of the utmost importance in qualitative research. This is underscored by Creswell (2009:191) who argues that researchers should ensure that the findings of their research are accurate.

The trustworthiness of this research was strengthened by clearly stating the parameters and background of the research, and by drawing on multiple data sources (Nieuwenhuis, 2007:113; Creswell, 2009:191) such as individual interviews, observations and focus group interviews. Inter-coder reliability (Nieuwenhuis, 2007:114; Creswell, 2009:191) was also performed for ensuring consistency in the

coding and categorising of data. In addition, a pilot study for both sets of the interview questions was conducted with two Intermediate Phase Mathematics teachers who were not part of the sample. The structured elements for observation were verified by the supervisor of this research.

1.5.2.2.6 The role of the researcher

McMillan and Schumacher (2006:344) describe the role of the researcher as “a relationship acquired by and ascribed to the researcher in interactive data collection”. The researcher developed all items for the three data collection instruments, analysed the collected data and eventually interpreted it. During all these processes the researcher was especially alert that his previous and current positions as official in the GDoBE may impact on the research results and constantly acted as “complete outsider” (McMillan & Schumacher, 2010:348). Furthermore, the researcher observed the protection of the rights and welfare of the research participants and made every effort to conduct the research in an ethically responsible manner.

1.5.2.2.7 Ethical considerations

Guided by the literature (*cf.* Leedy & Ormrod, 2005:101; Strydom, 2005:57; McMillan & Schumacher, 2010:338), the researcher endeavoured to adhere to all the basic ethical requirements associated with respectable research. Amongst others, the following aspects were attended to:

- The researcher applied and got approval from the authorities in the Gauteng Department of Basic Education (**Appendix A**), the Ethics Committee of the Vaal Campus of the North-West University (NWU) (**Appendix B**) and school principals concerned (**Appendix C**), to conduct the research.
- An informed consent form (**Appendix D**) was designed and given to the sampled participants prior to their participation to assure them of the adherence of this study to sound ethical conduct. In this form the purpose of the research and the nature of the participants' involvement were clarified.
- It was explained to participants that their involvement in the research was voluntary and, should they wish to, they could suspend their involvement in the research at any time.
- Participants were assured of the observance of confidentiality and anonymity at all times.

- Permission from the sampled participants was sought to audio-tape the interview sessions. Participants were informed that the audio-taped records were exclusively for ensuring the accuracy of the interview information and that it will only be used for transcribing and verifying the data.
- Lastly, all parties were informed that the results of the study will be made accessible for scrutiny or further action by them.

1.5.2.2.8 Data collection process

After the research instruments were developed and the required approval and ethical clearance from the GDoBE (**Appendix A**) and the NWU (**Appendix B**) to conduct the research were obtained, the data collection process unfolded as follows:

- Piloting the data collection instruments.
- Sampling of the three districts, six schools and eleven teachers for inclusion in the research.
- Obtaining the approval of the six school principals to conduct the research in their respective schools (**Appendix C**).
- Obtaining the informed consent of the eleven sampled teachers to participate in the research (**Appendix D**).
- Making the logistical arrangements to continue with the data collection process.
- Conducting and recording the results of the individual face-to-face interviews (11), structured observations (11) and focus group interviews (two).

1.5.2.2.9 Data analysis and interpretation

In the case of this study the researcher constantly engaged with the collected data. Based on the steps outlined by Creswell (2009:185) and by following the suggestions made by Nieuwenhuis (2007:100), the interview data were transcribed after which codes were assigned to the transcribed raw data. Thereafter, the codes were categorised into *a-priori* categories. In the case of the observations, the researcher's anecdotal notes, which outlined the observed elements, were converted to express the observed elements in codes.

1.6 DELIMITATIONS OF THE RESEARCH

According to Best and Kahn (2006:37), delimitations are concerned with the restrictions imposed on the study by the researcher. The delimitations of this study included the following:

- The study was conducted within the confined boundaries of three education districts situated in the Gauteng Province (*cf.* 1.5.2.2.3).
- The study only included Grade 5 Mathematics teachers within the mentioned districts.
- The empirical study relied only on the qualitative research approach, which affected the generalizability of the research results.

Nevertheless the mentioned delimitations, the researcher was convinced that the reported research has the potential to serve as thrust for similar research in different contexts.

1.7 SIGNIFICANCE AND POSSIBLE CONTRIBUTION OF THE RESEARCH

It was argued that the knowledge gained through this research could contribute to a better understanding and implementation of AfL by teachers. Consequently, the impact of AfL on the improvement of learners' performance in Mathematics on primary school level, was also considered to be a possible contribution emanating from the study.

1.8 POSSIBLE CHALLENGES OF THE STUDY

It was anticipated that teachers who initially participated in the pilot study of the GDoBE, were no longer interested in AfL or that they were no longer available as potential participants due to promotions or other factors. Related to the aforementioned, the possibility was also foreseen that teachers who participated in the pilot study were no longer teaching Grade 5 Mathematics due to new work allocations. One of the major challenges that the researcher expected, was that the teachers may try to make an impression, due to the researcher's position in the GDoBE.

1.9 RESEARCH OUTLAY

In order to achieve the stated objectives the report on the research developed as follows:

Chapter 1: Introduction and motivation of the study

Chapter 2: Review of the literature on assessment and Mathematics as school subject

Chapter 3: Overview of the empirical study

Chapter 4: Data analysis and interpretation

Chapter 5: Summary of findings, conclusion and recommendations

1.10 CONCLUSION

In this chapter, the study was briefly introduced and motivated. The problem, purpose, research questions and objectives were outlined and an overview of the conceptual framework and research methodology was provided. Delimitations of the study, its significance and possible contribution as well as possible anticipated challenges were also presented. The chapter was concluded by delineating the structure of the study.

The discussion in the chapter which follows is drawn from the literature and focuses on assessment and Mathematics as school subject.

CHAPTER TWO

ASSESSMENT AND MATHEMATICS

2.1 INTRODUCTION

This study centres on the comprehension and implementation of assessment *for* learning (AfL) by selected Gauteng primary school Mathematics teachers that participated in the AfL pilot project of the Gauteng Department of Basic Education (GDoBE). Before approaching this focus empirically, this chapter will endeavour to uncover three of the secondary research questions from a theoretical perspective which is informed by a literature study. The three applicable questions read as follows:

- How is assessment *for* learning defined and characterized within the context of educational assessment?
- How is assessment *for* learning justified in terms of learning and learner achievement?
- How is Mathematics as subject positioned within the South African school curriculum?

Although these three questions guided the researcher's search for literature appropriate to the purpose of the study, the researcher remained mindful of the fact that AfL forms the core of the study while Mathematics only serves as the platform through which the comprehension and implementation of AfL is explored. Hence, this chapter will define, characterise and justify AfL by contextualising assessment within recent educational reforms in South Africa, by also considering constructivism and scaffolding as features of the South African school curriculum. Thereafter, the concept 'assessment' will be examined and discussed in order to arrive at a better understanding of the notion 'assessment *for* learning'. The chapter will be concluded by considering Mathematics as subject within the South African school curriculum.

2.2 CONTEXTUALISING ASSESSMENT WITHIN RECENT EDUCATIONAL REFORMS IN SOUTH AFRICA

2.2.1 An introduction to recent educational reforms in South Africa

As human beings, we are destined either to improve our existing systems or to discover new ones (Lombard, 2010:31). Since 1994, South Africans experienced countless systemic changes in all sectors of life, of which the education sector was no exception to the rule. In this regard, Earl (2003:1) draws attention to the fact that schools in particular, reflect the changes that are occurring more broadly in society and that there seems to be no end to the changes that schools are expected to keep up with, or even to lead – which is also true for South Africa. Living in one of the most complex and heterogeneous countries in the world, South Africans are faced with educational challenges such as equal access to schools, equal educational opportunities, relevance of curricula, inadequate finances, inadequate facilities, shortage of educational materials and inadequately qualified teaching staff (Van der Horst & McDonald, 1997:5). According to Gultig (2003:171) and Jacobs (2004:58) the South African education system was renovated since 1994 from primary school level to tertiary level as part of the rejuvenation of post-apartheid institutions to bring the country in line with current trends in international education. According to Van der Horst and McDonald (1997:5), two main reasons served as thrusts for educational reforms in South Africa:

- To provide equity in terms of educational provision and to promote a more balanced view, by developing learners' critical thinking power and their problem solving abilities.
- To provide adequate educational and training opportunities to all people who need to learn; not only scholars, but also adults and youths who have already left the school.

Against this background and by keeping the purpose of the study in mind, it would be meaningful to gain an awareness of curriculum related reforms since 1994, which is the point of discussion in the following sub-section.

2.2.2 A brief overview of recent curriculum related reforms in South Africa

The first democratic elected government resolved that the adoption of an Outcomes-based education (OBE) system would energise social, political and economic changes within the country (Msila, 2007:150). Botha (2002:362) maintains that the idea of the implementation of OBE was supported because it promised success to all learners (Spady, 1994:10) by providing them with the necessary knowledge, skills,

values and attitudes to cope in an evolving world. Based on the confidence that OBE allows for learner-centred, activity-based and achievement-orientated education (DoE, 2002c:122), it accentuates the process rather than the product of learning (Spady, 1994:8). OBE is rooted in Behaviourism (Hoadley & Jansen, 2009:178), Pragmatism (Ramoroka, 2006:23), Constructivism (Gagnon & Collay, 2006:5) and Critical theory (Burger, 2008:20). However, the powerful influence of the constructivist philosophy on OBE is recognisable since meaningful learning, the application of discovered information (Olivier, 1998:20; Meyer, 2000:2), scaffolding (DoE, 2007:22) and the development of learners to become active, critical participants in society (Burger, 2008:20), are some of the prominent features associated with OBE.

Regardless of the condemnation of OBE in the South African context (Jansen, 1999:145-156; Cross, Mungadi & Rouhani, 2002:181), it was accepted as foundation in which all future school curricula should be embedded. Launched in 1997 (Cross *et al.*, 2002:178), Curriculum 2005 (C2005) became the first South African school curriculum based on the OBE paradigm to be implemented as from 1998 to improve the quality of education in South Africa (DoE, 1997:10). Following a report by the Ministerial Review Committee of C2005 (DoE, 2000; Du Plessis, Conley & Du Plessis, 2009:53), this curriculum was amended and “streamlined” (Chisholm, 2005:193) and gave way to the Revised National Curriculum Statements (RNCS) (Chisholm, 2003:4). As soon as the amendments to the curriculum became policy in 2002, the revised curriculum became known as the National Curriculum Statement (NCS) (DoE, 2002a). Once more, the curriculum was revised in 2009. The revision of the NCS resulted in the Curriculum and Assessment Policy Statements (CAPS). Allowing for a five year time frame, the CAPS is currently in the process of implementation in schools from 2010 to 2014 (DoBE, 2010:1).

2.2.3 Assessment within the context of recent curriculum related reforms in South Africa

Also of value for this study, is the position of assessment within the mentioned curriculum reforms. Renowned for its flexibility, C2005 allowed for the idiosyncratic use of teaching methods, learning approaches and assessment strategies in order to ensure that outcomes were met (Du Toit & Du Toit, 2004:6). Moreover, although

guided by sixty six specific outcomes, the curriculum content was determined by teachers which, evidently, also impacted on reliable, valid and justifiable assessment. These practices not only resulted in a mechanistic or behaviouristic achievement of outcomes but also caused detrimental effects on learning (Deacon & Parker, 1999:61, 63). According to Jansen (1999:153), assessment in C2005 was dominated by summative assessment without considering the formative development of learners; thus ignoring the constructivist principles on which C2005 was supposed to be founded.

In the RNCS/NCS, designated curriculum content for each grade (Hoadley & Jansen, 2009:162) was accompanied by assessment standards which also signified progression (Hoadley & Jansen, 2009:164). Though it can be assumed that these amendments to the curriculum helped to improve the reliability and validity of assessment, while also allowing for more legitimate assessment, the following two concerns were still evident:

- Since three documents, namely The National Curriculum Statement, The Learning Programme Guidelines and The Assessment Guidelines directed assessment, it posed challenges to teachers to unify the contents of all three documents to inform their assessment practice.
- Although assessment was considered by the revised curriculum as being part of teaching and learning, summative assessment still featured more prominently than formative assessment in the abovementioned documents.

With the introduction of the CAPS, it was stated that the curricula for all approved school subjects comprises “one clear and accessible policy document” (DoE, 2011b:14) in which the National policy pertaining to programme and promotion requirements of the National Curriculum Statement Grades R-12 and the National Protocol for Assessment Grades R-12 are incorporated. OBE terminology, such as learning outcomes and assessment standards, was replaced by general and subject specific aims (DoBE, 2010:20). Curriculum content for each grade was categorised according to topics, which also made provision for progression. As in the case of the RNCS/NCS, it can be assumed that the stated aims and their associated topics increased the reliability, validity and legitimacy of assessment. However, even though continuous assessment is highlighted in the CAPS (DoBE, 2011c:294), it

appears as if summative assessment still receives considerable more attention since the number and types of assessments tasks of which the results must be recorded, are pedantically stipulated.

2.2.4 Deduction

From the discussion in this section (2.2), it is evident that the South African education system endured significant reforms during the last, almost two decades. The curriculum (in all its facets), is one particular area on which these reforms impacted greatly. Not only was the education system exposed to a 'new' paradigm (OBE), but also challenged to operationalize this paradigm by means of three (almost different) curriculums during the past 15 years (1998 – 2013). Considering the evidence in the above discussion, it appears as though assessment as critical element of these curriculums did not realise its *constructivist* and *scaffolding* potential as was initially expected. To enable the researcher to substantiate this last remark, it is necessary to examine the two concepts in more detail.

2.3 CONSTRUCTIVISM AND SCAFFOLDING: FEATURES OF THE SOUTH AFRICAN SCHOOL CURRICULUM

2.3.1 Constructivism

Both Taber's (2001:45) claim that the human mind knows only what the human mind has made, and Pange and Pange's (2011:62) pronouncement that learners learn better when attributing personal meaning to information, insinuate constructivist learning. Constructivism is a learning theory which suggests that learners should be afforded opportunities to actively construct knowledge by building internal connections between existing and new information in order to come to a personal understanding which will enable them to apply the gained knowledge in different contexts and to solve problems (Stiggins, 2002:759; Gunter, Estes & Schwab, 2003:108/109; Borich & Tombari, 2004:7; Eggen & Kauchak, 2004:28; Schunk, 2004:285; Baker, McGaw & Peterson, 2007:2). It acknowledges learner differences in terms of learning styles (preferences) (Gabler & Schroeder, 2003:10), personal experiences (Booker, 2007:353; Burger, 2008:21) and perceptions (Burger, 2008:22). Witt, Elliot, Kramer, and Gresham (1994:179) postulate that through his theories of *assimilation* and *accommodation*, Piaget can be regarded as one of the

original constructivists. When newly attained information is related and incorporated into an existing framework without changing such a framework, it is referred to as *assimilation*, while *accommodation* implies that an existing framework is changed to accommodate or retain new information (Witt *et al.*, 1994:179). By means of assimilation and accommodation, it is admitted that the learning processes are taking place within the learner (the constructor of knowledge). According to Chieu *et al.* (2005:10), the cognitive premises on which Piaget's theories are founded, relate to *cognitive constructivism*. This is affirmed by Heddens, Speer and Brahier (2009:13) who state that *cognitive constructivists* view learning as the process of incorporating and restructuring knowledge and skills that are acquired through personal experiences.

Viewed from another perspective, constructivism could also imply collaboration and social interaction. Constructivism of this nature is known as *social constructivism* (Chieu, *et al.*, 2005:10). Vygotsky's (1978:57) suggestion that the power of social interaction and language on learning should not be underestimated, are pertinent to the notion of *social constructivism*. Key principles on which Vygotsky's view of constructivism is founded, are the more knowledgeable other (MKO) and the zone of proximal development (ZPD). *The more knowledgeable other* (MKO) refers to someone "who has a better understanding or a higher ability level than the learner, with respect to a particular task, process, or concept" (Booyse, 2010:49/50). Related to the MKO is *the zone of proximal development* (ZPD) which signifies the space between what the learner can accomplish autonomously and what he or she can achieve with support of others (Woolfolk, 2004:52; O'Brien, 2008:14).

With regard to classroom practice and assessment, learner-centeredness forms the linchpin of the constructivist paradigm. Rushton, Eitelgeorge and Zickafoose (2003:18/19) as well as Khoboli and O'Toole (2011:80) contend that when applying a learner-centred approach the focus of planning, content and pedagogy shift from teacher expectations to learner interest. Based on the information obtained from Pillay (2002:93/94), Van Aswegen and Dreyer (2004:295) and Horn (2009:511-525) a learner-centred approach can be characterised as:

- inclusive;
- considerate;

- occurring in a safe learning environment;
- responsive to learners prior experiences and life histories, and
- appreciative of learners' uniqueness and individuality.

Complementing and adding to the aforementioned, Killen (2007:5, 7-10) presents the following traits of a constructivist, learner-centred approach:

- learners are actively engaged;
- it is governed by a democratic teaching and learning climate;
- activities are interactive in nature;
- learners are encouraged to act responsibly and autonomously;
- learners' questions and interests are valued;
- learners are exposed and encouraged to use a range of learning materials;
- learners' pre-knowledge is respected and tapped;
- as alternative to teacher instruction, teacher mediation and guidance are more prominent;
- meaning is negotiated;
- assessment is continuous and focuses on the processes as well as the products of learning;
- knowledge is viewed as being dynamic and varies according to personal experience, and,
- cooperation amongst learners and teamwork are promoted.

2.3.2 Scaffolding

Similar to the scaffolding used in the construction industry to support workers as they work on a specific task, educational scaffolding represents the provision of temporary support structures to assist learners in accomplishing a particular learning task they could not achieve on their own. Once the learners have mastered the task, the scaffolding is removed; shifting the learning responsibility from the teacher to the learner. Clearly signalling its entrenchment in Vygotsky's notions of MKO and ZPD, Killen (2007:9) explains scaffolding as "providing a learner with enough help to complete a task and then gradually decreasing the help as the learner becomes able to work independently". Booyse (2010:73) defines scaffolding as "a strategy which provides a temporary, supportive and adjustable framework for a learner to be enabled to participate in or complete a task/activity that is beyond the learner's

reach". In practical terms, the above implies that a learning problem is broken down into smaller and simpler steps by specifically drawing the learner's attention to the key features of the problem and by progressively transferring responsibility to the learner to come up with a solution to the problem (Gifford, 2005:53).

Hogan and Pressley (1997) provide the following guidelines for implementing scaffolding:

- select suitable tasks that match curriculum goals, subject learning objectives and learners' needs;
- allow learners to help create instructional goals;
- consider learners' background and prior knowledge to assess their progress – material that is too easy will quickly bore learners and reduce motivation;
- use a variety of scaffolding strategies to support learners' progress through the task (e.g. prompts, questions, visual material);
- provide encouragement and praise to keep learners motivated;
- allow learners to explain their progress to help them to stay focused on the learning goal;
- monitor learners' progress through feedback;
- create a welcoming, safe and supportive learning environment that encourages learners to take risks and try alternatives;
- help learners to become less dependent on instructional support as they work on tasks, and
- encourage learners to practice learning tasks in different contexts.

Vaguely described, Gagnon and Collay (2006:23) mention intervention and guidance as strategies that can be used to scaffold learning; whereas Balaban (1995:52) is more specific when identifying focused questions and positive interactions as scaffolding strategies. Woolfolk (2004:50) refers to clues, reminders, encouragement, breaking problems down into smaller parts and the provision of examples, as strategies which could allow learner development and independence by means of scaffolding.

Although Saye and Brush (2004:349/350) mention factors such as: deep learning and discovery, the encouragement of meaningful and dynamic discussions, the

motivation of learners to become better learners and the recycling of learning to other learning situations, as some of the benefits of scaffolding, this subject also poses some challenges. These include the following:

- planning and implementing scaffolding is time consuming and demanding;
- selecting appropriate scaffolding strategies to match the diversity of learners could be difficult;
- knowing when to remove the scaffold so that learners do not become over reliant on the support could be problematic, and
- not knowing learners well enough to provide appropriate scaffolds.

2.3.3 Deduction

Derived from the discussions thus far, it can be concluded that the constructivist ideals of the South African education system are expressed in terms of the development of learners' critical thinking and problem solving abilities (*cf.* 2.2.1). It should be considered though, that these factors are largely dependent on learner-centred, activity-based and achievement-orientated education, which accentuates the processes rather than the products of learning (*cf.* 2.2.2). Bearing in mind that assessment in all the South African school curricula since 1997 shows an apparent domination by summative assessment (*cf.* 2.2.3), one can conclude that this convention not only disregards the power of scaffolding, but also contradicts the notion of constructivism.

2.4 ASSESSMENT

2.4.1 Introduction

In addition to the argument that assessment plays a critical part in any educational process (Murphy & Torrance, 1988:7), it also mirrors the quality of teaching and learning taking place in a country's education system (SAQA, 2001:14 quoting Rowntree, 2003). This is underscored by Dreyer (2008:5) who suggests that assessment not only reveals what learners have learnt, but also the effectiveness of the ways in which learning take place and how learning is affected by teaching. Although Musial, Nieminen, Thomas and Burke (2009:4) maintain that assessment could be employed for different purposes, Dreyer (2008:2) points to the fact that

most teachers perceive assessment as a tedious and boring exercise which involves a lot of administration, while it is detested by most learners.

2.4.2 Defining assessment

Falchikov (2005:1) argues that assessment can be best explained by considering its so-called seven pillars on which it is founded. Formulated as questions these seven pillars include the following:

- *Why assess?* This question deals not only with the purposes of assessment, but also about the use of the assessment results.
- *How to assess?* This question considers the nature of the information yielded by the assessment.
- *What to assess?* This question focuses on the forms of assessment, e.g. exhibitions, observations or oral presentations.
- *When to assess?* This question refers to the frequency of assessment.
- *Who assesses?* To be able to answer this question, one should consider as to whether the assessment should be done by the teacher, by the individual learners themselves, or by peers.
- *How well do we assess?* This question refers to the inferences that can be drawn from the assessment results and implies validity and reliability.
- *What next?* As a result of assessment, this question directs attention towards improving teaching or learning experiences.

This multi-dimensional view is confirmed by Musial *et al.* (2009:4). Du Plessis, Conley and Du Plessis (2009:69) also state that assessment is an omnibus term which primarily includes all the processes and products describing the nature and extent of learners' learning and the degree of correspondence between learning and the aims and objectives of teaching. To be able to define assessment appropriately, using a multi-dimensional perspective, it is perhaps necessary to consider it from different viewpoints. Amongst others, two such viewpoints could stem from a cyclical or process position and from a continuous or a balanced position.

2.4.2.1 Defining assessment using a cyclical or process point of view

Within the South African education system, assessment is officially explained as "... a process of collecting, analysing, synthesizing and interpreting information to assist

teachers, parents and other stakeholders in making decisions about the progress of learners” (DoE, 2005:5; DoBE, 2011d:4). Added to these official explanations of assessment, the abundance of attempts in the literature to define assessment from a cyclical or process point of view is remarkable. For example, Earl (2003:5) regards assessment as a process of gathering information about learners’ performance and using such information for improving learning. Harlen (2007:12) refers to assessment as the process of collecting evidence and making judgments in relation to learning targets. Whereas Airasian and Russell (2008:9) state that assessment is a process of collecting, synthesizing and interpreting information in order to make a decision, Dreyer (2008:4) refers to assessment as the systematic gathering of information about component parts of something to be evaluated. De Witt (2008:37) suggests that assessment is a way of finding out what a learner knows, understands, values and can do. Extending on this view, Musial *et al.* (2009:6) explain assessment as the art of placing learners in a context that brings out or clarifies what they know and can do, as well as what they may not know or cannot do.

Derived from the aforementioned, the researcher concurs with Lombard (2010:35) who suggests that from a cyclical or process point of view, assessment can be defined as gathering, analysing, interpreting, recording, reporting and using information related to learners’ learning.

2.4.2.2 Defining assessment using a continuous or balanced point of view

According to Witt, Elliott, Kramer and Gresham (1994:5) assessment is regarded as an ongoing process which involves the use of an array of materials and techniques across time periods and situations. Siebörger and Macintosh (1998:25) consider continuous assessment as assessment taking place “on and off throughout a course or period of learning”. Continuous assessment is also described as on-going assessment throughout a learning experience (Le Grange & Reddy, 1998:11). Using a continuous or balanced point of view, Chapman and King (2005:1) describe assessment as an ongoing activity through which teachers gather data before, during and after instruction from multiple sources to identify learners’ needs and strengths. The continuous or balanced position from which Chappuis, Stiggins, Arter and Chappuis (2005:3) view assessment is evident when it is suggested that teachers must utilise assessment to ascertain as to whether learners have learned

what was intended to learn as well as for determining how learners are progressing towards the intended learning objectives. Also signalling a continuous or balanced point of view, Du Plessis, Conley and Du Plessis (2009:69) mention that assessment should form an integral part of instruction. These two aforementioned lines of reasoning also resonate with Stiggins' (2002:761) appeal for a balanced assessment system in which equilibrium between formal and informal assessment is maintained. Further strengthening the appeal for balanced assessment, Earl (2003:21) and Lombard (2010:34) refer to the fact that the concept assessment originates from the Latin verb *assidere*; denoting "to sit with". Within the context of the classroom, this would imply that teachers are expected *to sit with* the learners (or applying informal assessment) during the teaching and learning process.

Derived from this exposition, it can be concluded that from a continuous or balanced point of view, assessment should not be seen as an "occasion" but rather as a continuous course of actions which include formal as well as informal assessment tasks to improve learning and stimulate learner growth and development.

2.4.3 Purposes of assessment

Inferred from the literature, it seems possible to classify the purposes of assessment in two broad categories. For the purpose of this study, the researcher differentiates between general or common purposes and dedicated or operational purposes of assessment. This classification does not imply that the purposes under each category are mutually exclusive, but it should rather be seen as a practical measure for justifying the researcher's explanations.

2.4.3.1 General or common purposes of assessment

Although Witt *et al.* (1994:17) suggest that the overriding purpose of all assessments is to gather information to facilitate effective decision making, Earl (2003:21) reveals that assessment has many purposes which can either complement or contest one another. To highlight these 'many' purposes, a selection of purposes cited in the literature is presented.

In terms of the General Education and Training (GET) Band, it is stated that assessment should achieve the following purposes (DoE, 2002b:1):

- to develop learners' knowledge, skills and values,
- to identify the needs of learners,
- to enable teachers to reflect on their practice,
- to identify learners' strengths and weaknesses,
- to provide additional support to learners,
- to revisit or revise certain sections where learners seem to have difficulties,
- to motivate and encourage learners,
- to provide information or data to a variety of stakeholders, and
- to demonstrate the effectiveness of the curriculum or a teaching strategy.

McMillan (2007:9) mentions three factors that can be regarded as general or common purposes of assessment. These include:

- assessment serves a notifying purpose, as it informs the teacher as to whether it is necessary to speed up, slow down or change the methods of teaching;
- assessment helps the teacher to understand how learners learn and what barriers to learning the learners may experience, and
- assessment helps teachers to make formal and informal judgments about learners' performance and progress.

Five purposes, which can be classified as general or common purposes of assessment, are mentioned by Nieman (2008:79):

- to improve teaching and learning;
- to identify or rectify shortcomings in learners' performance;
- to identify or rectify barriers to learning;
- to give feedback to learners, parents, guardians and other stakeholders about learners' progress, and
- to help learners to use feedback to set targets for improving their performance.

Other general or common purposes of assessment are also described by a variety of other authors. For instance, Gouws (2008:53) refers to the purposes of assessment as to improve teaching; to provide information about learners, teachers and schools; to drive curriculum and teaching and to act as a selection and certifying device. For Du Plessis *et al.* (2009:70), the purposes of assessment comprise of the diagnosis and rectifying of mistakes, the provision of feedback, the enhancement of learner

motivation, to add variety to learning experiences and to gain information to direct teaching. Chappuis, Commodore and Stiggins (2010:13) allude to the fact that assessment serves the purpose of gathering evidence of learning to inform instructional decisions. According to the DoBE (2011d:4) the purpose of assessment is to “provide an indication of learner achievement in the most effective and efficient manner by ensuring that adequate evidence of achievement is collected using various forms of assessment”.

2.4.3.2 Dedicated or operational purposes of assessment

Complementing the general or common purposes of assessment, the literature also provides evidence that an assessment task should match its purpose (Caldwell, 2008:23). Viewed in this way, Vandeyar and Killen (2007:102), conclude that the ways in which teachers assess are mainly determined by their perceptions of the purpose of the assessment task. Sharing the same sentiments, Reyneke (2008:34) argues: “if assessment is to be used for any specific purpose, ... it should be properly planned and aligned to that specific purpose” while Geyser (2012:92) contends that the purpose of assessment “determines the time when the learner will be assessed, as well as the assessor(s), and the methods and the techniques chosen”.

Understood in the way outline above, the dedicated or operational purposes of assessment serve as descriptors of how information obtained through assessment will be used. For example, this implies that baseline assessment does not necessarily represent a type or form of assessment, as usually referred to in colloquial language, but rather that the assessment is done with a baseline purpose in mind. Therefore, baseline assessment is conducted to ascertain learners’ prior knowledge or for determining learners’ entry level. Through baseline assessment, the teacher will gain information of how to proceed with a learning task (Dreyer, 2008:17). In addition to the fact that assessment could serve a baseline purpose, it could also serve diagnostic, formative or summative purposes.

2.4.3.2.1 *Diagnostic assessment*

Van Rooyen and Prinsloo (2003:90) assert that diagnostic assessment assists the teacher in making informed decisions to take corrective actions where learners

experience problems with the learning material. Leighton and Gierl (2007:3) state that from diagnostic assessment results, adaptations and modifications can be inferred. Hence, a teacher will apply assessment for diagnostic purposes in order to identify and resolve possible factors interfering with learning. These factors may be external to the learner (e.g. the teacher's teaching methods) or internal to the learner (e.g. a reading problem). It can be deduced that diagnostic assessment can only be successful if two elements are present: the identification of a problem and intervention to solve the problem.

2.4.3.2.2 Formative assessment

The DoE (2002b:2) views formative assessment as “developmental” and “informative”. Black *et al.* (2004:12) explain formative assessment as a process during which information about learning is evoked and used to modify teaching and learning activities. This is underscored by Marnewick and Rouhani (2006:269) who suggest that formative assessment takes place during the learning process with an informative purpose in mind since it advises teachers as well as learners about learners' progress. Reyneke (2008:35) maintains that formative assessment is not judgmental but rather focuses on constructive criticism to encourage and motivate learners. According to Nieuwoudt and Reyneke (2011:282/283), formative assessment serves to guide learner improvement, to diagnose problems and enable learners to rectify mistakes, to determine learners' prior knowledge, to provide feedback on teachers' teaching, to motivate learners and to add variety to teaching and learning. From the aforesaid, it is clear that feedback is a pivotal element of formative assessment and that the outcomes or ‘results’ of formative assessment need not to be formally recorded or reported.

2.4.3.2.3 Summative assessment

Reddy (2004:32) argues that assessment for summative purposes is particularly concerned with summarising learning. Said differently, summative assessment is assessment aimed at taking stock of learning experiences or giving “an overall picture of learners' progress at a given time” (DoE, 2002b:2). Marnewick and Rouhani (2006:269) relate summative assessment to tests or examinations which are usually performed to determine learner promotion to a next grade. The researcher concurs with Reddy (2004:33) when stating that school effectiveness in

terms of curriculum delivery, is strongly governed by learner performance in summative assessment.

2.4.4 Assessment approaches

Assessment is usually approached from an informal or formal position. However, Oosterhof (2009:2) draws attention to the fact that both informal and formal positions are critical for successful assessment. Consequently, these positions should be regarded as reciprocal rather than as mutually exclusive. To differentiate between the informal and formal positions from which assessment can be approached, the following proves to be useful (McAlpine, 2002:7; Brown & Rolfe, 2005:194; DoE, 2007:7; Oosterhof, 2009:6):

- Informal assessment takes place in the usual, day-to-day classroom situation whereas formal assessment takes place under 'assessment conditions' which are more likely to cause learner stress.
- Unlike formal assessment, informal assessment does not measure or express learner performance in terms of marks or grades. Moreover, informal assessment does not utilise specific assessment criteria or standards with which learners should comply.
- Whilst formal assessment predominantly evaluates or makes judgements about learner progress, the monitoring of learner progress typifies informal assessment.
- Since informal assessment is integrated in teaching and learning activities, it requires less special arrangements (e.g. setting a test, making provision for a test date, ensuring that the learning content is appropriately covered), to execute than formal assessment.

Gathered from the above, the following surfaces: although informal assessment appears to be unplanned, it is incorporated into teaching and learning activities and should be seen as complementary to formal assessment. In terms of the dedicated or operational purposes of assessment (*cf.* 2.4.3.2), it can also be deduced that, with the exception of summative assessment, baseline, diagnostic, and even formative assessment, could be approached from either an informal or formal position.

Since the complementary issue between informal and formal assessment is prominently mentioned, it is also important to consider the notion of continuous assessment.

2.4.5 Continuous assessment

The concept *continuous assessment* is mainly used to refer to assessment which contains both formative and summative purposes and which is administered in its totality within a particular school context (DoE, 2007:32). This implies that the planning of assessment, the setting of assessment tasks, the completion and the marking of such tasks, are all done in the particular school. In view of the fact that it includes informal as well as formal assessment managed by the school, the researcher concurs with Raoof (2013:1) who reasons that the terms continuous assessment (CASS) and *school-based assessment* (SBA) are very similar. In addition, continuous assessment also resonates well with the concept *daily assessment* (DoE, 2007:7), while the association between continuous assessment and Stiggins' (2002:761) notion of *balanced assessment* (cf. 2.4.2.2) is also remarkable.

Adapted from Killen (2007:340), the main features of continuous assessment include the following:

- It reduces the power of formal tests and examinations and encourages and makes provision for the implementation of a variety of other forms of assessment.
- In addition to assessment **of** learning, it allows for the introduction to and implementation of assessment **for** learning.
- It encourages regular assessment and assists teachers to use assessment information to inform their teaching.
- It inspires reflection on and renewal of teaching practices to match learner needs.
- It acknowledges the value of informal assessment in terms of learners' progress.
- It emphasises the transparency of assessment and makes assessment more 'learner-friendly'.

- It creates a need for continuous, detailed and accurate record keeping of learners' progress.
- It encourages learner involvement and self-regulation.

2.4.6 Assessment *of*, *for* and *as* learning

In addition to the differentiation between the purposes of assessment (*cf.* 2.4.3), the approaches to assessment (*cf.* 2.4.4) and the notion of continuous assessment (*cf.* 2.4.5), assessment can further be explored by viewing it from three different perspectives. According to these three perspectives, assessment can be classified as assessment ***of*** learning, assessment ***for*** learning and assessment ***as*** learning. Earl (2013:30) declares that although all three these perspectives contribute to learner performance, they do so “in vastly different ways”. Counting on the ground breaking work of, amongst others, Black and Wiliam (1998a), Stiggins (2002), Earl (2003) and Black, Harrison, Lee, Marshall and Wiliam (2004), an overview of the mentioned three perspectives is provided in the sub-sections which follow.

2.4.6.1 Assessment *of* learning

Assessment of learners' learning remains an essential part of education (Harlen, 2007:1). Hence, Earl (2003:22) values assessment ***of*** learning as equally important to assessment ***for*** and ***as*** learning. However, Earl (2013:29) also alerts us that AoL is “the predominant kind of assessment in schools”. Chappuis, Stiggins, Arter and Chappuis (2005: 23) state that AoL is carefully administered to ensure accuracy and comparability of the assessment results. McMillan (2007:16) typifies assessment ***of*** learning (AoL) as “external accountability testing” meaning that assessment is mainly done to provide proof of learner performance. Understood in this way, AoL is related to summative assessment (*cf.* 2.4.3.2.3) which is usually carried out at the end of a learning experience and of which the results are used for decision making purposes and to signal learners' relative position of performance in comparison to other learners (Earl 2003:22; Harlen, 2007:121). A meaningful synopsis of AoL is given by Stiggins (2002:759) who states that AoL “tell(s) us how much students have learned, whether standards are being met, and whether educators have done the job they were hired to do”.

2.4.6.2 Assessment **for** learning

According to Earl (2003:24), AfL shifts the emphasis from summative to formative assessment. Said differently: rather than making judgements about learners' learning, AfL provides information that can be used to improve learners' learning (Earl, 2013:27). Conforming with the aforementioned, Harlen (2007:119) and Chappuis *et al.* (2010:23), contend that AfL is not meant for making comparative judgements about learners' performance, but to provide information about learners' strengths and weaknesses to assist them in their learning. Airasian and Russell (2008:124) point to the fact that AfL affords learners the opportunity to have continuous access to evidence of their own learning which enables them to decide, in partnership with their teachers, how to move their learning forward. In addition, Earl (2013:27) indicates that teachers utilise their personal knowledge of individual learners together with their understanding of the assessment context and curriculum goals to identify particular learning needs during AfL. While Dreyer (2008:23) states that AfL supports instruction, Earl (2013:27) mentions that with its interactive nature, it occurs throughout teaching and learning events.

Gathered from the above outline, AfL can be described as classroom assessment aimed at the improvement of learning. Based on this reasoning, the Assessment Reform Group (1999:7) proposes that the success of AfL is dependent on the following factors:

- teachers' views on successful teaching and learning,
- the sharing of learning goals,
- helping learners to know and recognise the set standards that need to be attained,
- the involvement of learners to assess themselves,
- the provision of feedback to guide learning,
- the confidence that every learner can improve, and
- the involvement of both teachers and learners.

Complementing and expanding on these factors, Stiggins (2002:761-762) put forward eight ways in which the facilitation of AfL is embedded:

- understanding and articulating learning targets at the commencement of teaching and learning,
- informing learners at the beginning of a teaching and learning event about the learning goals to be attained in a learner-friendly language,
- converting learning goals into relevant assessment tasks and scoring procedures to accurately capture learner performance and achievement,
- applying classroom assessment in such a way that it will stimulate learner confidence and responsibility,
- translating classroom assessment results into frequent descriptive feedback which will provide learners with insights as to how to improve their learning,
- continuously adjusting instruction, based on the results of classroom assessment,
- engaging learners in regular self-assessment, related to constant standards, to watch themselves grow over time, and
- actively involving learners in communicating about their learning achievements and improvements.

Drawing on the suggestions of Stiggins (2002), Black, Harrison, Lee, Marshall and Wiliam (2004) and Clarke (2005), five practises guide the successful implementation of AfL. These include the sharing of learning intentions, questioning, feedback, peer and self-assessment and the formative use of summative assessment. Although teachers who formed part of the GDE AfL pilot project (*cf.* 1.1 and 3.6) were only introduced to the first four of these practises, all five practises will be briefly discussed hereafter.

2.4.6.2.1 Sharing learning intentions

Nitko and Brookhart (2011:141) claim that learning is likely to improve once learners are informed and understand what the learning expectations are. Supplementing this claim, Clarke (2001:19) alludes to the fact that learners are not only more motivated and task-oriented if they know what the learning intentions are, but by being aware of what is expected, they are better situated to make decisions about how to go about a given task. It is therefore imperative to ensure that learning intentions are clearly and unambiguously communicated to learners in learner-friendly language. Learning intentions could be shared in verbal, written or visual

forms and have greater effect if it is introduced at the start of a lesson and referred back to during the lesson or to allow learners to talk about it. In essence, learning intentions consist of two parts: learning targets and success criteria. While learning targets answer to the question: *What are we going to learn?* success criteria answer to the question: *How do we know we have met the learning target?* In the context of the NCS, learning targets would include the **learning outcomes**, while the **assessment standards** would refer to success criteria.

2.4.6.2.2 Questioning

Jacobs (2011:173) postulates that questioning is central to effective teaching and learning. It is further stated (Jacobs, 2011:173), that questioning is beneficial in various ways since it could be used to:

- help learners to link their prior knowledge to new information,
- direct learners' attention towards the attainment of the learning intentions,
- facilitate active learner participation,
- avoid misinterpretations,
- highlight main lesson points, and
- summarise and conclude a lesson.

However, Jacobs (2011:174) also draws attention to the fact that successful questioning is demanding on both teachers and learners as it requires alertness in terms of the questions asked and the answers provided. In addition, it can be said that successful questioning largely depends on teachers' questioning competence.

To enhance teachers' questioning competence, Gunter, Estes and Schwab (2003:69/70) suggest the following guidelines:

- prepare a few questions ahead of a lesson to serve as steering questions,
- make provision for wait time after posing a question to allow learners to think,
- involve all learners by substituting questions such as "Do you understand?" with statements such as "After a minute I will ask someone to explain",
- do not focus on the same individuals to answer questions, and
- make provision for learners to gain confidence to answer questions, by allowing them to write their answers down before responding verbally.

To increase learner involvement and the quality of answers various questioning techniques could be employed. Amongst these are redirection, prompting, pausing, dealing with incorrect responses, calling on non-volunteers, seeking clarification and refocusing (Jacobs, 2011:176-180) and the think-pair-share model (Gunter *et al.*, 2003:271). A concise outline of these techniques appears below.

Redirection: after asking a question and receiving a response by a learner, the teacher calls on several other learners to add to the initial answer.

Prompting: after asking a question and receiving a weak or 'I don't know' response from a learner, a series of clues or leading questions could be asked to the same learner in order to guide the learner to a better quality answer.

Pausing: is similar to wait time and provides opportunities to learners to structure their responses before answering. Pausing can also occur after a correct answer is given, to allow learners to assimilate or process such an answer.

Dealing with incorrect responses: in the event of a wrong answer, a learner should be informed that the answer is incorrect, but encouraged to come up with the correct answer. Encouraging can be in the form of another chance for an alternative response; obtaining an answer from another learner in a way that keeps the first learner involved, or by prompting the learner for the correct answer.

Calling on non-volunteers: in an attempt to involve all learners, the teacher can apply a 'no hands up' policy, whereby learners are informed that they should not raise their hands but that they will be called upon or pointed at to answer the question.

Seeking clarification: although a learner's response may not be wrong, the teacher may seek more information to enhance the quality of the answer by using probing.

Refocusing: learners are asked to extend or relate their answers to other matters or content studied before.

Think-pair-share: after the teacher posed a question, learners think individually about a possible answer. Once all learners are ready with an answer, they turn to a

peer to formulate a common answer emanating from their original answers. The common answer is then shared with the rest of the learners.

Fundamental to successful questioning, is the cognitive quality of teachers' questions. By using Bloom's Taxonomy (Bloom, 1956; Anderson & Krathwohl, 2001) to guide the cognitive complexity of their questions, teachers could enhance the quality of their questions as well as the quality of learners' responses.

2.4.6.2.3 *Feedback*

Through feedback learners should be able to realise the gap between their actual performance and the intended performance. Therefore feedback should be current, accurate, focused and accompanied by examples or guidelines to assist learners to carry on with their work. Gunter *et al.*, (2003:271) allude to the fact that feedback is more effective when it is positive, frequent and descriptive in nature. O'Brien (2008:3) describes effective feedback as an opportunity provided to learners "to reflect on their investigative processes and experiences" and a way to encourage learners "to explore, experiment, and revise their work". Earl (2013:115) differentiates between informal feedback to refocus learners thinking and formal feedback which is more detailed and directive. Both can be given in either verbal or written form. In summary, Carless, Joughin and Liu (2006:5) and Black *et al.* (2004:13) declare that feedback is central to the learning process and when handled effectively it can be one of the most powerful ways of enhancing learning.

In practical terms the aforementioned implies that feedback should be guided by the learning intentions, that it should provide specific improvement suggestions, supplemented by guiding principles. In the GDE AfL pilot project, teachers were made aware of strategies such as "traffic lights" and "thumbs up/down" to stimulate feedback in the classroom. "Traffic lights" is where learners receive three coloured cards representing the colours of a traffic light: red, orange and green. During a lesson learners could show a red card if they do not understand, an orange card to indicate uncertainty and a green card if they grasp the work. With "thumbs up/down" learners use their thumbs to indicate their understanding (thumbs up) or non-understanding (thumbs down) of the work. These strategies make provision for

active learner participation in the lesson and for immediate feedback to the teacher concerning the progress of the lesson.

2.4.6.2.4 Peer and self-assessment

It is suggested that self-assessment is more beneficial to improve learning performance than peer assessment (Nitko & Brookhart, 2011:142). Self-assessment applied in AfL could also be seen as the channel for implementing AaL, since it could prompt metacognitive skills. However, both peer and self-assessment are important for nurturing learner independence, reflection and accountability (Lee, 2006:61). Black and Wiliam (1998a:143), warn that learners can only assess themselves and their peers if they have a sufficiently clear picture of the learning intentions. It is also important to note that both should be approached with care, since the trustworthiness of peer and self-assessment could easily be questioned. Therefore, peer and self-assessment should rather not be applied in formal assessment circumstances where assessment results are recorded. Implied in peer and self-assessment are aspects such as active learner participation, the development of thinking skills, the stimulation of intrinsic motivation and, especially in the case of Mathematics, the development of subject language (*cf.* 2.6).

2.4.6.2.5 The formative use of summative assessment

Although not forming part of the GDE AfL pilot project, summative assessment results could be used as a means of taking learning forward. In the context of AfL this implies that the outcome of summative assessment could be used to guide the improvement of learners' performance. For example, learners could be expected to improve on their answers to the questions of a summative test. In so doing, they are not only engaged in assessing themselves but also to reflect on their work. Inherent in these processes is also a motivational aspect, since learners are confronted with their mistakes, but also with how to correct them.

2.4.6.3 Assessment as learning

Assessment **as** learning (AaL) is seen as reinforcing and extending AoL by emphasizing the role of the learner as the critical connector between assessment and learning (Harlen, 2007:25; Lombard, 2010:51; Earl, 2013:28). Earl (2013:28) further regards AaL as a "sub-set" of AoL which uses assessment as "a process of

developing and supporting metacognition". In AaL learners are actively engaged to make sense of information, relate it to prior knowledge and eventually master existing knowledge or construct new knowledge. By applying skills such as reflection, self-regulation and critical thinking, learners use assessment feedback to adapt or change their understanding and to monitor their own learning. According to Harlen (2007:25) AoL represents the ultimate learning goal where learners are their own best assessors.

2.4.7 Deduction

Assessment in education has undergone major changes over the past years. Due to political and systemic educational changes, changes related to assessment were perhaps more obvious and significant in a country such as South Africa. It influenced how teachers view their work and act on a daily basis in their classrooms. In pursuing a balanced assessment system (*cf.* 2.4.2.2), teachers were expected to look beyond tests and examinations and to explore other ways and means of assessment. The emergence of AfL on the assessment scene prompted widespread interest; also locally. However, in the light of the deductions in 2.2.4 and 2.3.3 the introduction to and implementation of AfL in South African schools remains a challenge.

2.5 MATHEMATICS AS SUBJECT WITHIN THE SOUTH AFRICAN SCHOOL CURRICULUM

With specific reference to Mathematics in the Intermediate Phase, which is the context in which this research was performed, this section envisage to outline the aspects endorsing the inclusion of Mathematics in the South African school curriculum. While the discussion in this section includes the South African school curriculum, which is renowned for its constant changes, it is perhaps necessary to shed some light on the time period (2012/2013) during which the largest part of this study was conducted (*cf.* 1.5.2.2.3 and 3.6). During these mentioned years, and more specifically 2013, the curriculum of the particular grade (Grade 5) on which the study focuses, changed from the National Curriculum Statements (NCS) to the Curriculum and Assessment Policy Statement (CAPS). Due to this transitional

period, the researcher finds it appropriate to include both curricula in the discussion on Mathematics as subject within the South African school curriculum.

2.5.1 Defining Mathematics

According to the Department of Education (DoE, 2002e:4), Mathematics is defined as “a human activity that involves observing, representing and investigating patterns and quantitative relationships in physical and social phenomena and between mathematical objects”. The DoBE (2011c:8) later added that Mathematics “is a language that makes use of symbols and notations to describe numerical, geometric and graphical relationships”. Van de Walle (in Dednam, 2011:212), declares that Mathematics is a three-pronged concept which is characterised by:

- its focus on patterns and associations between different entities;
- its distinctive and specific language, and
- its content which is structured in a unified, interconnected and co-dependent manner.

Derived from the mentioned viewpoints, it can be concluded that Mathematics has a distinguishing language code and is embedded in everyday human activities which contain quantifiable properties.

2.5.2 The value and aims of Mathematics as subject

In as far as the value of Mathematics as subject is concerned, the DoE (2002e:4) predicts that it will generate mathematical literate learners who are empowered to develop new mathematical ideas and insights and who are able “to contribute to and participate with confidence in society”. The DoBE (2011c:8) augmented the aforementioned by stating that the value of Mathematics lies also in its potential to develop “mental processes that enhance logical and critical thinking, accuracy and problem-solving that will contribute in decision-making”.

The inclusion of Mathematics as subject in the curriculum, aims to develop the following in learners (DoE, 2002e:4/5; DoBE, 2011c:8):

- a critical awareness of how mathematical relationships are used in social, environmental, cultural and economic relations,
- confidence and competence to deal with any mathematical situation without being hindered by a fear of Mathematics,

- an appreciation for the beauty and elegance of Mathematics,
- a spirit of curiosity and love for Mathematics,
- an awareness of the diverse historical, cultural and social practices of Mathematics,
- recognition that Mathematics is a creative part of human activity,
- deep conceptual understanding in order to make sense of Mathematics,
- the acquisition of specific knowledge and skills required for:
 - the application of Mathematics to physical, social and mathematical problems,
 - the study of related subject matter and
 - further studies in Mathematics.

It is thus evident that Mathematics is included in the school curriculum to stimulate mathematical awareness and to enable learners to successfully respond to a wide range of mathematical problems, which eventually, could filter through to promote the well-being of society.

2.5.3 The focus of the subject: Mathematics

Intermediate Phase Mathematics comprises of five content parts (DoE, 2002e:6; DoBE, 2011c:9):

- Numbers, Operations and Relationships;
- Patterns, Functions and Algebra;
- Space and Shape(Geometry);
- Measurement, and
- Data handling.

Implicit in these content areas, Mathematics also focuses on (DoE, 2002e: 5; DoBE, 2011c:8):

- developing the correct use of mathematical language;
- developing number vocabulary, number concept, calculation and application skills;
- developing listening, communication, thinking and logical reasoning skills;
- skills related to investigation, analysis, representation and interpretation;
- problem solving skills, and

- the realisation of the importance of Mathematics in real life situations.

Inferred from the above, Intermediate Phase learners are exposed to overt as well as covert knowledge, skills and attitudes in Mathematics.

2.5.4 Assessment in Mathematics

Assessment in Mathematics is described by the DoE (2002e:93) as “a continuous, planned process of gathering information about the performance of learners measured against the Assessment Standards of the Learning Outcomes. It requires clearly defined criteria and a variety of appropriate strategies to enable teachers to give constructive feedback to learners and to report to parents and other interested people.” To attain the aforementioned, it is stated that assessment should be:

- transparent and clearly focused,
- integrated with teaching and learning,
- based on predetermined criteria or standards,
- varied in terms of methods and contexts, and
- valid, reliable, fair, learner-paced, and flexible enough to allow for expanded opportunities (DoE, 2002e:94).

It is further stated that the Assessment Standards, which describe “the depth and breadth of what learners should know and be able to do” (DoE, 2002e:3), serve as indicators of the intended purposes of assessment or how assessment could be approached (DoE, 2002e:3). Although continuous assessment is explicated to include both informal and formal assessment, more emphasis is given to the implementation of formal assessment in the NCS by prescribing the number of formal assessment tasks that needs to be recorded in each term (DoE, 2002e:9). In addition, the Assessment Guidelines do not refer to AfL overtly, but use phrases such as “question and answer session”, “self-assessment”, “peer assessment” and “feedback” (DoE, 2002e:7).

The description of assessment in the CAPS is very much similar to the description provided in the NCS as outlined above. Although minimum requirements for formal assessment are provided in terms of the forms, number and weighting of formal assessment tasks (DoBE, 2011c:294), slightly more attention is given to the fact that assessment should include both informal and formal assessment tasks (DoBE,

2011c:293). Moreover, informal or daily assessment is explicitly associated with AfL (DoBE, 2011c:294).

Derived from the information in this sub-section, it is evident that although phrases such as 'continuous assessment' and 'informal assessment' are used in both the NCS and CAPS, the obvious, preferred importance attached to formal assessment is manifested in how assessment is defined and in the guidelines that should direct assessment.

2.6 JUSTIFYING AfL IN THE MATHEMATICS CLASSROOM

Over and above the GDE's laudable initiative to introduce AfL into classrooms (cf. 1.1 and 3.6), the researcher would like to rationalise the implementation of AfL in the Mathematics classroom.

According to Cockburn (2007:2) Mathematics is a subject that the vast majority of learners can enjoy if they are enabled to understand mathematical processes rather than memorising mathematical facts. It can be assumed, that the more learners are involved in the processes of mathematical learning, the more successful their mathematical performance will be. To substantiate this assumption, Lee (2006:70) and Cockburn (2007:19) claim that once learners are able to talk about mathematical concepts, they are not only better positioned to understand and use such concepts, but also to reflect on the inherent mathematical processes. In addition, learners will realise what they still have to learn. Inferred from the aforementioned, the development of learners' mathematical register (Lee, 2006:12) to express their mathematical ideas (Lee, 2006:2) is imperative. The language of mathematics must thus be developed in order to be able to express ideas, concepts and processes that form the basis of the subject. According to Lee (2006:2;96), increasing learners' ability to use mathematical language means that they are enabled to verbalise, control, explore and extend their understanding of the subject matter with more confidence.

To attain the above said, teachers should involve learners by increasing discourse in the Mathematics classroom. In this way learners will be encouraged to gain ownership and control in terms of their mathematical learning. Learners' articulated understanding and misunderstanding could be employed to focus instruction (Rose, Minton & Arline, 2007:21), while questioning probes could serve to differentiate

instruction, to analyse trends in learners' thinking, to promote learner to learner dialogue and to allow for individual reflection (Rose *et al.*, 2007:22). According to Keeley and Tobey (2011:5), classroom dialogue could also result in the provision of feedback to learners on their mathematical learning. Moreover, classroom dialogue could also assist learners to develop self- and peer assessment skills (Keeley & Tobey, 2011:5). Hence, it can be resolved that classroom discourse has the potential to stimulate all four elements of AfL, namely sharing learning intentions, questioning, feedback and self- and peer assessment (*cf.* 1.4.2).

2.7 CONCLUSION

Based on a literature review, this chapter attended to three of the secondary research questions (*cf.* 2.1) by considering the notion of assessment and Mathematics as subject. Assessment was contextualised within recent educational reforms, while attention was also given to constructivism and scaffolding, assessment as construct and Mathematics as school subject. The chapter concluded with an attempt to justify AfL in Mathematics.

In the chapter which follows, an overview of the empirical study will be provided.

CHAPTER THREE

OVERVIEW OF THE EMPIRICAL STUDY

3.1 INTRODUCTION

The purpose of this chapter is to outline the research methodology applied in the empirical study. By considering the purpose of the study, the chapter intends to outline the research paradigm, the research design, the strategy of inquiry, the population and sampling, the data collection methods and the quality criteria applicable to the empirical study. The pilot study, role of the researcher and appropriate ethical considerations will also be discussed. The chapter will be concluded by clarifying the research process.

3.2 PURPOSE OF THE STUDY

According to Thomas (2009:21), research is about curiosity and inquiry as it aims to generate new knowledge. However, for research to be successful it should be founded on a clear purpose and directed by relevant, valid and ethical procedures. The purpose of this study centres on exploring the extent to which assessment **for** learning (AfL) is comprehended and implemented by selected Gauteng primary school Mathematics teachers. To operationalize this purpose the following related objectives were formulated:

- To define and characterize AfL within the context of educational assessment.
- To justify AfL in terms of learning and learner achievement.
- How is Mathematics as subject positioned within the South African school curriculum?
- To explore how AfL is comprehended by selected Gauteng primary school Mathematics teachers.
- To explore the extent to which AfL is implemented by selected Gauteng primary school Mathematics teachers.

Whereas the first three objectives were addressed by means of the literature study, the last two require an investigation of empirical nature. To inform the purpose of the study, these last two objectives will be deciphered within the empirical framework discussed in the following sections.

3.3 RESEARCH PARADIGM

According to Burton and Bartlett (2009:18), a paradigm is a network of coherent ideas about the nature of the world which also underpins researchers' thinking about, and ways in which they conduct research. Nieuwenhuis (2012b:48) postulates that paradigms "serve as the lens or organising principles by which reality is interpreted". While Schwandt (2003:294) mentions Positivism, Interpretivism and Pragmatism as three different paradigms, Thomas (2009:77) and Burton and Bartlett (2009:20) suggest that Positivism and Interpretivism provide for the two main different perspectives from which human thinking and action can be viewed and understood. Cohen, Manion and Morrison (2011:17) refer to these two perspectives as Positivist and anti-Positivist. Whereas the Positivist paradigm assumes that the social world (human nature) exists in the same way as the natural world (scientific nature), it is also believed that research approaches used in natural sciences are applicable in the social sciences. On the other hand, the Interpretivist paradigm contends that "human experience ... cannot be separated from the person who is experiencing it" (Welman, Kruger & Mitchell, 2005:6). Thus, human nature is best understood within social situations in which interaction features prominently.

By considering the above explanation, this study adopted the Interpretivist paradigm. The researcher argued that engagement with selected Gauteng primary school Mathematics teachers on a personal and professional level will help him to best understand the extent to which AfL is comprehended and implemented by these teachers.

3.4 RESEARCH DESIGN

According to Leedy and Ormrod (2005:85) a research design provides the overall structure in which the research will be conducted and is selected with the central goal of solving the research problem in mind. Adding to the aforementioned, McMillan and Schumacher (2006:117) indicate that the goal of a research design is to provide credible research results. Three empirical research designs can be distinguished: qualitative, quantitative and mixed methods research designs. Since qualitative and quantitative research form the basis for all research designs, qualitative and quantitative researchers are characterised by their different worldviews, or in the case of the social world, views of human behaviour (Johnson &

Christensen, 2012:33). Qualitative research entails the exploration of the meaning individuals ascribe to a social phenomenon by using emerging procedures and inductive data analysis and interpretation in order to arrive at a critical understanding of such a phenomenon (Leedy & Ormrod, 2005:133; Creswell, 2009:4). Research approached in a quantitative manner "...asks specific, narrow questions, collects numeric data from participants, analyses these numbers using statistics and conducts the inquiry in an unbiased, objective manner" (Creswell, 2005:39).

Although it is admitted that both qualitative and quantitative research are equally important (Creswell, 2003:3; Johnson & Christensen, 2012:32), education research often strives to comment upon educational phenomena and processes or to propose changes for improving educational experiences (Burton & Bartlett, 2009:6). Based on the following characteristics cited by Bogdan and Biklen (2007:3), the researcher reasoned that a qualitative research design will be best suitable to respond to the purpose of this study.

- Qualitative research is naturalistic in nature since it is conducted in actual settings. In the case of this research, the researcher intends to investigate how selected teachers practise AfL by 'entering' their day to day classroom teaching.
- The researcher is the key data collection instrument. Since the researcher wants to explore the extent to which AfL is comprehended and implemented by selected primary school Mathematics teachers, he is interested in how these teachers make sense of AfL by engaging with them in dialogue (interviews) and observations.
- Descriptive data in the form of words or pictures are collected. The researcher aspires to consider as much as possible narrative and detailed information to endorse his understanding of the extent to which AfL is comprehended and implemented by selected primary school Mathematics teachers.
- Data are analysed inductively and data are not intended to prove or disprove hypotheses. In this study, the data 'will speak for itself'. Emerging results will be used to reveal the extent to which AfL is comprehended and implemented by selected primary school Mathematics teachers.

3.5 STRATEGY OF INQUIRY

According to Creswell (2009:11), a strategy of inquiry “provides specific direction for procedures in a research design”. Hence, the concept indicates which specific research method is employed in examining a particular research problem. Guided by the Interpretive paradigm which favours a qualitative research design, the strategy of inquiry for this research could include narrative biography, phenomenology, grounded theory, ethnography, content analysis or a case study (Leedy & Ormrod, 2005:135-142; Johnson & Christensen, 2012:394; Fouché & Schurink, 2012:312/313).

Fouché and Schurink (2012:320) state that qualitative researchers are primarily interested in the meaning their research participants assign to life experiences. Hence, it is necessary for qualitative researchers to immerse themselves in the activities of their research participants. While McMillan and Schumacher (2006:26) and Johnson and Christensen (2012:395) indicate that a case study is an ideal strategy of inquiry to illustrate a specific issue, Ary, Jacobs, Razavieh and Sorensen (2006:32), Bogdan and Biklen (2007:59), Thomas (2009:115) and Lichtman (2013: 90) maintain that a case study involves detailed or in-depth research. Fouché and Schurink (2012:320) also add that a case study allows a qualitative researcher to gain access to the social worlds and lives of research participants since it allows for obtaining an “intimate familiarity” with the research participants’ being. In an attempt to define a case study, Rule and John (2011:4) state that it is “a systematic and in-depth investigation of a *particular instance in its context* (my italics) in order to generate knowledge”.

Considering the aforementioned explanations and definition of case study research, the researcher adopted this strategy of inquiry since it was the intention to explore and come to an understanding (*in-depth research*) of the comprehension and implementation of AfL (*a particular instance*) by selected Gauteng primary school Mathematics teachers (*within a specific context*). Seeing that the researcher planned to involve primary school Mathematics teachers from different contexts (ex-Model C and Township schools) in the study, the strategy of inquiry used in this particular study could be referred to as a multiple case study (Leedy & Ormrod, 2005:135) or a multisite case study (McMillan & Schumacher, 2006:27).

3.6 POPULATION AND SAMPLING

Best and Kahn (2006:13) define a population as a group of individuals with at least one common characteristic which distinguishes that group from other individuals, while Fraenkel and Wallen (2008:90) refer to a population as a large group to which the researcher hopes to apply the research results. A sample, on the other hand, is a small proportion of the population (Best & Kahn, 2006:13). Through sampling, the researcher applies a selection process to choose individuals from the population to participate in a specific research project (Fraenkel & Wallen, 2008:90). According to Maree and Pietersen (2012:172) sampling methods can be divided into probability and non-probability methods. The degree to which research results can be generalised to the population is increased when probability sampling is applied and decreased in the case of non-probability sampling (Maree & Pietersen, 2012:172,177). However, non-probability sampling methods are often used when conducting qualitative research; especially when the research is aimed at a very peculiar population.

For this particular research, the population consisted of teachers who participated in the pilot project on AfL organized by the Gauteng Department of Basic Education (GDoBE) and who teach Grade 5 Mathematics in ex-Model C and Township primary schools. The reason why Grade 5 teachers were identified stems from the fact that the GDoBE pilot project on AfL was specifically aimed at these teachers. The decision to use Mathematics as platform (*cf.* 2.1) is based on the rationale that the researcher served as Mathematics Subject Facilitator for many years and felt comfortable to conduct the research in a Mathematics environment. Since the researcher was based at the Head Office of the GDoBE in the capacity of Coordinator (Systemic Evaluation) while conducting this research (*cf.* 2.5), the study was aimed at the school districts closest to the researcher's office to alleviate financial and accessibility restrictions. By means of non-probability, convenience sampling (Maree & Pietersen, 2012:177), the Johannesburg-West, Johannesburg-North and Ekurhuleni-South districts formed part of the research. Primary schools in these districts, who participated in the GDoBE pilot project on AfL, were purposively (Cohen, Manion & Morrison, 2011:156; Maree & Pietersen, 2012:178) sampled. By considering all the relevant ex-Model C as well as Township primary schools in the said districts a total number of six schools were identified to be included in the

research; four ex-Model C schools and two Township schools. Teachers teaching Grade 5 Mathematics in the identified schools and who were involved throughout the GDoBE pilot project were also purposively sampled as research participants. These teachers were considered information-rich, key informants (McMillan and Schumacher, 2006:319) who could assist the researcher to understand primary school Mathematics teachers' comprehension and implementation of AfL, following the initiative of the GDoBE. Eleven teachers, six from the four ex-Model C primary schools and five from the two Township primary schools were eventually identified from the three districts and six schools to be individually interviewed and observed during the presentation of a lesson. In the case of the focus group interviews, the researcher purposively selected one school from each type (ex-Model C and Township) with the highest number of teachers participating in the research. This implies that the two focus group interviews consisted of three teachers each.

3.7 DATA COLLECTION METHODS

Multiple data collection methods were used to obtain data relevant to the purpose of the research. These methods included individual interviews, observations and focus group interviews.

3.7.1 Individual interviews

Greeff (2005:287) asserts that interviewing is the “predominant mode of data or information collection in qualitative research”. According to Koshy (2010:85), richer and more informative information can be obtained through interviews than through questionnaires. Different types of interviews are distinguished. Amongst these are unstructured interviews, semi-structured interviews, structured interviews, open-ended or guided interviews, ethnographic interviews, closed qualitative interviews and focus group interviews (Greeff, 2005:292-312; McMillan & Schumacher, 2010:206; Johnson & Christensen, 2012:200).

Based on the nature of this study, individual, semi-structured interviews (Newby, 2010:340) were planned for acquiring information on the research participants' implementation of AfL (*cf.* 1.5.2.2.4) (**Appendix E**). Nieuwenhuis, (2012a:87) describes semi-structured interviews as interviews which “define the line of inquiry”. This implies that the researcher formulates a set of questions beforehand to ensure

that the same questions are asked to all the participants. In addition, semi-structured interviews allow the researcher some freedom to supplement information by asking probing or clarifying questions (Thomas, 2009:164; Mertler & Charles, 2011:113). When formulating the interview questions, the researcher was sensitive that questions should be brief, clear and in simple language (Mertler, 2009:110). Individual interviews were conducted with the 11 purposively sampled teachers. Each interview was planned to last between 20 and 30 minutes and took place after schools hours at agreed upon times between the researcher and the participants. By tape-recording the interviews, the researcher ensured that data are available to be transcribed for analysis, interpretation and verification purposes.

3.7.2 Observations

According to Mertler (2009:107), an observation as a means of collecting qualitative data, involves the careful watching and systematic recording of what the researcher see and hear in a particular setting. Nieuwenhuis (2012a:84) states that observations provide the researcher with an “insider perspective” of the dynamics and behaviour within a particular context. Strydom (2012:329) prefers the term *participant observation* since observational research necessitates presence of the research participants within the context which will be observed. Therefore, participant observation can be described as “a qualitative research procedure that studies the natural and everyday set-up in a particular community or situation” (Strydom, 2012:330). Nieuwenhuis (2012a:84/85) distinguishes between four types of observations which include the following:

- Complete observer, where the researcher acts as non-participant by observing the situation from a distance.
- Observer as participant, where the researcher becomes immersed in the situation but remains uninvolved by focusing only on observing.
- Participant as observer, where the researcher is involved in the situation by participating and observing.
- Complete participant, where the researcher is totally immersed in the situation and observes in a covert manner.

By acting as observer as participant, one lesson of each of the 11 sampled teachers was observed to see how the teachers implement AfL in a classroom situation (cf.

1.5.2.2.4). Although the observations were “overt” (Bogdan & Biklen, 2007:104) the “observer effect” (Fraenkel & Wallen, 2008:443) was minimized by explaining to the teachers and the learners beforehand, that the goal of the observations was to gain information from the lessons to inform the research purpose. Observations were structured (Thomas, 2009:183; Mertler, 2009:106; Nieuwenhuis, 2012a:85) since pre-determined elements from the literature on AfL were identified for observation (**Appendix F**). The researcher took anecdotal records (Nieuwenhuis, 2012a:85) to clarify the pre-determined elements suggested for observation. Observations were planned to observe Grade 5 Mathematics lessons during scheduled periods.

3.7.3 Focus group interviews

A focus group interview is a carefully planned discussion which is focused on a defined area of interest and which is dynamic in nature since it allows for interaction amongst research participants (Bogdan & Biklen, 2007:109; Fraenkel & Wallen, 2008:451; Greeff, 2012:361). Through focus group interviews a researcher is afforded an opportunity for comparing research participants shared views which is not always attainable through individual interviews (Nieuwenhuis, 2012a:90).

In the case of this study, two focus group interviews were conducted: one in an ex-Model C school and one in a Township school. In each case, three teachers participated in the focus group interview. The purpose of these interviews was twofold: to gather information on the research participants' comprehension of AfL (*cf.* 1.5.2.2.4) and to gain possible additional information to supplement and verify information obtained from the individual interviews and observations. Questions for the focus group interviews were formulated in advance to centre on the participants' understanding of AfL (**Appendix G**). The duration of the focus group interviews was between 20 and 30 minutes. These interviews were also tape-recorded and were conducted after school hours.

3.7.4 Principles considered for developing the data collection methods

The development of the interview questions and the elements to be observed was guided by the purpose of the study and informed by the literature study. Care was taken to include appropriate interview questions and elements to be observed which covered the purpose of the study thoroughly, but was limited to include only an

essential few. In phrasing the questions and elements, ambiguity was avoided as far as possible to allow for focused attention and the elimination of confusion. To enable the researcher to draw trustworthy inferences based on triangulated data, the correspondence between the respective interview questions and the elements to be observed was carefully checked.

3.8 QUALITY CRITERIA

Golafshani (2003:602) indicates that research of any nature and within any paradigm requires rigorous procedures for ensuring its quality. According to Maree and Van der Westhuizen (2012:37), quality criteria serve as indicators to demonstrate that the research was conducted in a responsible manner. The aforementioned is underscored by Koshy (2010:97), who declares that reliability and validity form the cornerstones of any research and should always be considered. With reference to qualitative research, De Vos (2005a:345/346), Maree and Van der Westhuizen (2012:38) and Nieuwenhuis (2012a:80) postulate that instead of referring to reliability and validity, qualitative researchers prefer the concepts “soundness” or “trustworthiness”. It is further stated that the trustworthiness of qualitative research can be increased by attending to credibility, transferability, dependability and conformability (De Vos, 2005a:345/346; Maree & Van der Westhuizen, 2012:38).

Credibility is accomplished by stating the parameters of the research (De Vos, 2005a:346). In the case of this study, the research problem, the research purpose, the research questions and objectives, the literature study, the research design, (which includes the sampling procedures, the data collection instruments and the data collection process), endorsed the credibility of the research. **Transferability** refers to the extent to which the research results can be generalised (De Vos, 2005a:346). By applying *triangulation* (Nieuwenhuis, 2012a:80) or *crystallisation* (Maree & Van der Westhuizen, 2012:40) a qualitative researcher can enhance the transferability of the research results. In this study, the researcher used data triangulation (De Vos, 2005b:362) in the form of multiple data collection sources (Nieuwenhuis, 2007:113; Creswell, 2009:191) to strengthen the transferability of the study's results (e.g. individual interviews, observations and focus group interviews). **Dependability** signifies an account of the changing conditions which may occur when the research is repeated in a different setting (De Vos, 2005a:346). Since the

exact replication of this research may be problematic, the meticulous description of the research background (e.g. the context in which the research took place and the participants involved in the research), could help to conduct comparable research. **Conformability** refers to the confirmation of the research results by conducting a similar study (De Vos, 2005a:347). To allow for conformability, the researcher relied solely on the emerging results by “clearing any researcher bias” (Maree & Van der Westhuizen, 2012:38) that could interfere with the collection or analysis of the data. Furthermore, it was anticipated to apply inter-coder reliability (Nieuwenhuis, 2007:114; Creswell, 2009:191) for ensuring consistency in the coding and categorising of data.

3.9 PILOT STUDY

To check whether the interview questions were understandable and unambiguous and to act pro-actively in avoiding any problems when conducting the interviews (Strydom & Delpont, 2012:395), the researcher piloted the individual and focus group interview questions with two Intermediate Phase Mathematics teachers falling outside the spectrum of the sample of the study. No problems were encountered during the pilot study and the interview questions were used as it was initially formulated. The elements to be observed were verified by the researcher's supervisor in relation to the two sets of interview questions.

3.10 THE ROLE OF THE RESEARCHER

The role of the researcher is very critical to qualitative research (Lichtman, 2013:25). This claim manifests in the following reasons: the researcher is the one who decides who to study and what to study; the researcher is the one who formulates the questions to be asked; the researcher collects the information, analyses and interprets it and, based on the research results, reach conclusions and make recommendations. Though McMillan and Schumacher (2006:344) describe the role of the researcher as “a relationship acquired by and ascribed to the researcher in interactive data collection”, this role is also subjected to “critical self-examination ... throughout the entire research process” (McMillan & Schumacher, 2010:12).

In this particular research, the researcher developed the respective interview questions and the elements to be observed and personally collected the required

data. The researcher was alert that his previous position as Mathematics Subject Facilitator and current position as Coordinator (Systemic Evaluation) in the Head Office of the Gauteng Department of Basic Education, may impact on the research process and results. Therefore, the researcher was especially thoughtful during the interviews and observations that teachers were not intimidated by the research. For this reason, the researcher tried to act as far as possible as “detached observer” (McMillan & Schumacher, 2010:348) “by coming in, collecting data and then leaving” (McMillan & Schumacher, 2010:348). The researcher also observed the protection of the rights and the welfare of the research participants in all respects by conducting the research in an ethical responsible manner. With regard to the data analysis and interpretation, the results were allowed to emerge naturally by eliminating or “bracketing” (Plano Clark & Creswell, 2010:287) the researcher’s assumptions.

3.11 ETHICAL CONSIDERATIONS

McMillan and Schumacher (2010:338) alleged that “a credible research design involves not only selecting informants and effective research strategies but also adhering to research ethics”. Research ethics is defined by Strydom (2005:57) as “a set of moral principles ... which offers rules and behavioural expectations about the most correct conduct towards experimental subjects and respondents”. According to Leedy and Ormrod (2005:101) most ethical issues in research can be classified in four categories: protection from harm, informed consent, right to privacy and honesty with professional colleagues. In the case of this study, the researcher considered the following in respect of each of the mentioned ethical categories.

- Due to the nature of the research, protection of harm was not considered to be a serious matter. However, the researcher was mindful not to expose the research participants to “unusual stress, embarrassment, or loss of self-esteem” (Leedy & Ormrod, 2005:101) during the interviews or observations.
- With regard to informed consent, the sampled participants were presented with an informed consent letter (**Appendix D**) prior to their participation to assure them of the adherence of the study to ethical principles (Halse & Honey, 2010:128). This letter described the purpose of the research, the nature of the participants’ involvement, an indication that their participation in the research is voluntary and that they can terminate their participation at any time.

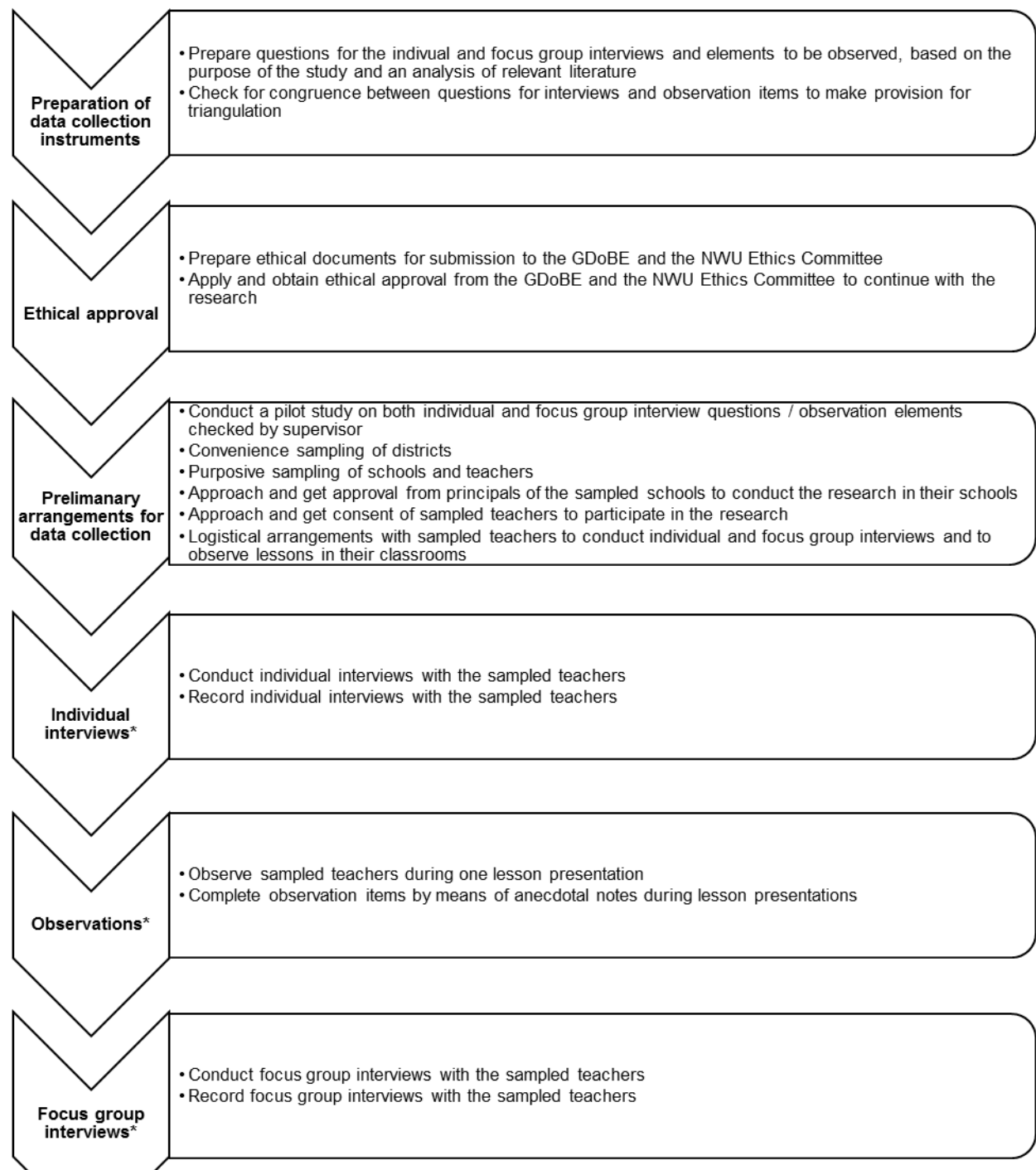
- An assurance that their participation and responses will be treated as confidential and anonymous was given to participants in recognition of their right of privacy. However, permission was requested from the participants to audio-tape the interview sessions to ensure the accuracy of transcribing the data. The researcher also pledged that the identity of the participating schools will not be divulged.
- By adhering to the quality criteria and the thorough documentation of sources, the researcher also complied with being honest in conducting the research and towards professional colleagues in the field of educational research. Moreover, the results of the study will be made accessible to the relevant principals and participating teachers, the respective districts of the GDoBE in which the study was conducted and to other officials of the GDoBE who have an interest in assessment.

In addition to the above, the researcher applied to and got approval from the GDoBE (**Appendix A**), the Ethics Committee of the Vaal Campus of the North-West University (**Appendix B**) and the respective school principals (**Appendix C**) to conduct the research. In all instances ethical approval was granted.

3.12 DATA COLLECTION PROCESS

Figure 3.1 below represents an overview of the data collection process. This process included several stages such as the preparation of the data collection instruments, ethical approval, the preliminary arrangements for data collection, individual interviews, observations and focus group interviews. Each stage was operationalized by specific actions.

Figure 3.1: An overview of the data collection process



* **Note:** The researcher acknowledges that the sequence of the data collection process differs from the sequence in which the last two secondary research questions/objectives are presented. However, the rationale behind the adoption of the sequence of the data collection process was based on the argument that the researcher wanted to prevent any interference of the focus group interview (teachers' comprehension of AfL) on the individual interviews and observations (teachers' implementation of AfL).

3.13 CONCLUSION

In this chapter, an overview of the empirical study was provided. The research paradigm, research design, strategy of inquiry, population and sampling and the data collection methods were discussed. In addition, attention was also given to the quality criteria, the pilot study, the role of the researcher and the ethical considerations that governed the research. The chapter concluded with a visual summary of the data collection process.

In chapter four which follows, the collected data will be analysed and interpreted.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

4.1 INTRODUCTION

This study centres on the following primary research question (cf. 1.3.1):

To what extent is assessment *for* learning comprehended and implemented by selected Gauteng primary school Mathematics teachers?

Embodied in the primary research question are the following two secondary research questions (cf. 1.3.2) which guided the empirical research:

- How is assessment *for* learning comprehended by selected Gauteng primary school Mathematics teachers?
- To what extent is assessment *for* learning implemented by selected Gauteng primary school Mathematics teachers?

This chapter intends to provide the analysis and interpretation of the empirical data obtained by means of the processes and procedures discussed in the preceding chapter. The data analyses and interpretations will be structured according to the order in which data collection took place (cf. 1.5.2.2.4 and 3.12).

4.2 ANALYSIS AND INTERPRETATION OF INDIVIDUAL INTERVIEWS

4.2.1 Background information

Eleven purposively selected teachers teaching Grade 5 Mathematics participated in the semi-structured individual interviews. Six of these teachers taught in ex-Model C schools and five in Township schools (cf. 1.5.2.2.3 and 3.6). The individual interviews were intended to gather information on the research participants' implementation of AfL (cf. 1.5.2.2.4).

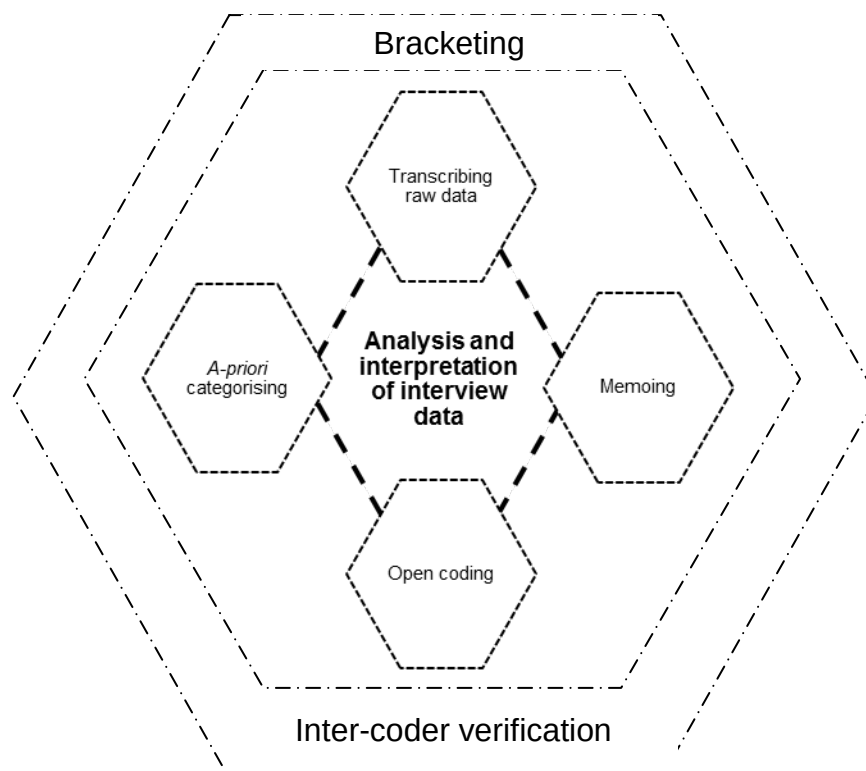
4.2.2 Analysis and interpretation of individual interview data

Individual interview data which were captured and archived on audio tape, were transcribed followed by a process of *memoing* (Nieuwenhuis, 2012c:104) during which the researcher critically engaged with the data in search for supplementary information. By means of *open coding* (Nieuwenhuis, 2012c:105) meaningful sections of the transcribed data were grouped together under *a priori* categories

(Nieuwenhuis, 2012c:99,107,109) (*cf.* 1.5.2.2.9). These categories were derived from the literature review and were also used to guide the construction of the interview guide. Hence, the individual interview data were analysed in a deductive manner and not inductively, as usually expected when approaching research qualitatively (*cf.* 3.4). To ensure the trustworthiness of the deductive manner in which the individual interview data were analysed and interpreted, the researcher constantly engaged with the data and intentionally “bracketed” (*cf.* 3.10) (Plano Clark & Creswell, 2010:287) any preconceived personal assumptions which could influence the outcomes of the research. In addition, provision was made for inter-coder reliability (*cf.* 1.5.2.2.5 and 3.8) by requesting a knowledgeable peer in the field of qualitative data analysis to verify the researcher’s analyses and interpretations. No major discrepancies in the two sets of findings were noted.

Figure 4.1 illustrates the iterative process (Nieuwenhuis, 2012c:99) which was followed to analyse and interpret the individual interview data. The dotted lines indicate that the mentioned elements are not necessarily done in a specific linear order (Schurink, Fouché & De Vos, 2012:403) and that they are inter-related.

Figure 4.1: The iterative process of analysing and interpreting the interview data



4.2.3 Presentation of coded individual interview data

Derived from the responses of the research participants, the raw transcribed data of the individual interviews reflect the coded accounts for each of the six individual interview questions (*cf.* **Appendix E**). The coded data are presented in Tables 4.1 (a) to 4.10 (b) on the following pages.

Table 4.1(a): Individual interview responses (Ex-model C teachers: Question 1)

Type of school	Ex-model C	Ex-model C	Ex-model C	Ex-model C	Ex-model C	Ex-model C
School code	A	B	C	D	D	D
Teacher code	C1	C2	C3	C4	C5	C6
Coded Responses: Question 1	Availability of resources to implement AfL					
	• Different resources • Policy documents • Books • Overhead projectors	• Resources are not a problem • Interactive whiteboard • Learners' textbook • Worksheets • Other materials from outside the classroom (e.g. newspapers which learners bring from home)	• Recording book • Learners' textbooks • Previous question papers • Rubrics	• A lot of resources	• Textbooks • Rulers • Tape measures • Trando wheels • Worksheets • Any Mathematics resources	• Textbooks • Resources provided by the GDoBE (e.g. workshop material on AfL)

Table 4.1(b): Individual interview responses (Township teachers: Question 1)

Type of school	Township	Township	Township	Township	Township
School code	E	E	F	F	F
Teacher code	T1	T2	T3	T4	T5
Coded responses: Question 1	Availability of resources to implement AfL				
	• Learner textbooks • Instruments (e.g. compass) • Calculators	• Learner textbooks • Teachers' guides • Overhead projectors • Worksheets	• Chalk board • Learners' textbooks • Worksheets	• Learners' textbooks • Instruments (e.g. compass)	• Any resources relevant to Mathematics and for involving learners

Table 4.2(a): Individual interview responses (Ex-model C teachers: Question 2)

Type of school	Ex-model C	Ex-model C	Ex-model C	Ex-model C	Ex-model C	Ex-model C
School code	A	B	C	D	D	D
Teacher code	C1	C2	C3	C4	C5	C6
Coded responses: Question 2	Discussing AfL with colleagues					
	• Yes • Teaching methods and strategies • Sharing ideas of consistent teaching	• Yes, only internal • Discuss questioning techniques • Discuss moderation of assessment tasks • Discuss number of assessment tasks	• Yes, during GPLMS training • Discuss challenges in Mathematics classrooms • Discuss different teaching methods	• Yes • Discuss CAPS • Discuss time allocation of Mathematics content • Discuss number of assessment tasks for term	• Yes, but not specifically for AfL • Discuss work schedule • Discuss strategies for supporting learners with special needs • Discuss language issues in the Mathematics classroom	• Yes, initially to discuss AfL techniques • No longer focused on AfL

Table 4.2(b): Individual interview responses (Township teachers: Question 2)

Type of school	Township school	Township school	Township school	Township school	Township school
School code	E	E	F	F	F
Teacher code	T1	T2	T3	T4	T5
Coded responses: Question 2	Discussing AfL with colleagues				
	• Yes • Discuss different methods of Mathematics teaching	• Yes, initially • Discussed different strategies and methods of AfL • Get used to AfL terminology • Currently, discussions on CAPS	• Yes • Discussions during GPLMS but not focused on AfL	• Yes, initially • Current discussions on setting questions, using Bloom	• Yes, initially • Discuss summative assessment

Table 4.3(a): Individual interview responses (Ex-model C teachers: Question 3)

Type of school	Ex-model C	Ex-model C	Ex-model C	Ex-model C	Ex-model C	Ex-model C
School code	A	B	C	D	D	D
Teacher code	C1	C2	C3	C4	C5	C6
Coded responses: Question 3	SMT support for AfL					
	• Yes • Support is 'slow' • HOD is hands-on • Encouraged to attend workshops • Internal discussion encouraged	• Yes • SMT is supportive • Encouraged to attend workshops • Not always time for discussions	• Yes • Supportive SMT • GPLMS support	• Yes • Supportive SMT • Encouraged to attend AfL workshops	• Yes • Supportive SMT • Attention diverted to CAPS	• Yes • Supportive SMT • Encouraged to attend workshops

Table 4.3(b): Individual interview responses (Township teachers: Question 3)

Type of school	Township	Township	Township	Township	Township
School code	E	E	F	F	F
Teacher code	T1	T2	T3	T4	T5
Coded responses: Question 3	SMT support for AfL				
	• Yes • SMT help with number of assessment tasks • SMT check relevancy of assessment tasks	• Yes • SMT encourage workshop attendance • SMT also attend workshops	• Yes • HOD attended AfL training • HOD supports	• Yes • Support more focused on CAPS and GPLMS	• Yes • HOD encourages implementation of AfL • HOD offers support by classroom visits

Table 4.4(a): Individual interview responses (Ex-model C teachers: Question 4.1)

Type of school	Ex-model C	Ex-model C	Ex-model C	Ex-model C	Ex-model C	Ex-model C
School code	A	B	C	D	D	D
Teacher code	C1	C2	C3	C4	C5	C6
Coded responses: Question 4.1	Sharing learning intentions					
	• Informing learners in advance about next lesson • Discuss intention at beginning of lesson	• Stimulate learners' interest at the beginning of lesson	• Discuss lesson topic before lesson commences	• Write learning intention on the board • Discuss expectations before starting the lesson	• Teacher explains lesson topic • Learners discuss topic using talking partners	• Revise previous lesson • Write learning intention on the board • Start with question related to the intention

Table 4.4(b): Individual interview responses (Township teachers: Question 4.1)

Type of school	Township school	Township school	Township school	Township school	Township school
School code	E	E	F	F	F
Teacher code	T1	T2	T3	T4	T5
Coded responses: Question 4.1	Sharing learning intentions				
	- Revise previous lesson - Teacher introduces new lesson by means of teaching aids	Teacher informs learners about topic	Teacher introduces lesson by means of teaching aids	Teacher reminds learners during lesson about intentions	Teacher shares learning intention at beginning of lesson

Table 4.5(a): Individual interview responses (Ex-model C teachers: Question 4.2)

Type of school	Ex-model C	Ex-model C	Ex-model C	Ex-model C	Ex-model C	Ex-model C
School code	A	B	C	D	D	D
Teacher code	C1	C2	C3	C4	C5	C6
Coded responses: Question 4.2	Questioning					
	- Teacher-led questions - Follow-up questions - Encouraging learner explanation	- Teacher and learner questions - Learner discussion is encouraged	- Questions throughout the lesson - Encouraging learner participation	- Questions to whole class - Encourage individual learners to answer - Sometimes group generated answers	- Using 'no-hands-up' technique - Why? Questions to stimulate learner thinking	Takes Bloom levels into account

Table 4.5(b): Individual interview responses (Township teachers: Question 4.2)

Type of school	Township	Township	Township	Township	Township
School code	E	E	F	F	F
Teacher code	T1	T2	T3	T4	T5
Coded responses: Question 4.2	Questioning				
	Teacher questions to determine learner understanding	- Questions to whole class - Questions to individual learners - Consider Bloom - Consider thinking time	Teacher-led questions throughout lesson	Use questions as provided by the GPLMS programme	- Link questions with learning intentions - Consider Bloom

Table 4.6(a): Individual interview responses (Ex-model C teachers: Question 4.3)

Type of school	Ex-model C	Ex-model C	Ex-model C	Ex-model C	Ex-model C	Ex-model C
School code	A	B	C	D	D	D
Teacher code	C1	C2	C3	C4	C5	C6
Coded responses: Question 4.3	Feedback					
	• Written and verbal feedback • Written: what is wrong and how to correct it • Verbal: interaction with learners	• Verbal • To encourage learner questions	• Verbal and written • Mainly for group work	• Throughout the lesson • Sometimes between learners	• When books are marked • Individual learners	• Verbal and written • Based on learning intentions and success criteria

Table 4.6(b): Individual interview responses (Township teachers: Question 4.3)

Type of school	Township	Township	Township	Township	Township
School code	E	E	F	F	F
Teacher code	T1	T2	T3	T4	T5
Coded responses: Question 4.3	Feedback				
	• Amongst learners using their own language	• Written and verbal • After marking learners are called individually	• Written • In books	• When learners' books are marked • Verbal to individual learners	• Any time during lesson presentation • Feedback on activities • Verbal and written

Table 4.7(a): Individual interview responses (Ex-model C teachers: Question 4.4)

Type of school	Ex-model C	Ex-model C	Ex-model C	Ex-model C	Ex-model C	Ex-model C
School code	A	B	C	D	D	D
Teacher code	C1	C2	C3	C4	C5	C6
Coded responses: Question 4.4	Self-assessment					
	• Learners marking own work • Underline mistakes • Correct mistakes	• Homework given as enrichment • Learners mark homework	• Learners mark corrected work with pencils	• Learners marking own work • Learners check if answers correspond with answers on the board	• Learners marking own work • Teacher check marking	• Very little • Teacher provides a checklist

Table 4.7(b): Individual interview responses (Township teachers: Question 4.4)

Type of school	Township	Township	Township	Township	Township
School code	E	E	F	F	F
Teacher code	T1	T2	T3	T4	T5
Coded responses: Question 4.4	Self-assessment				
	• Learners mark own work • Teacher checks marking	• Learners check homework in class	• Learners check homework • Using teacher developed checklists	• Learners mark own work • Teacher checks marking	• Learners check activities • Learners check homework

Table 4.8(a): Individual interview responses (Ex-model C teachers: Question 4.5)

Type of school	Ex-model C	Ex-model C	Ex-model C	Ex-model C	Ex-model C	Ex-model C
School code	A	B	C	D	D	D
Teacher code	C1	C2	C3	C4	C5	C6
Coded responses: Question 4.5	Peer assessment					
	• Learners exchange work • Learners mark in pairs	• Learners divided according to abilities • Stronger learners help weaker learners	• Learners exchange books • Mark each other's work with pencil • Teacher checks marking	• Not done • Learners are weak • Teacher needs to mark	• Learners exchange books • Mark each other's work • Teacher checks marking	• No peer assessment • Learners are not happy when other learners mark their work

Table 4.8(b): Individual interview responses (Township teachers: Question 4.5)

Type of school	Township	Township	Township	Township	Township
School code	E	E	F	F	F
Teacher code	T1	T2	T3	T4	T5
Coded responses: Question 4.5	Peer assessment				
	• Learners exchange books • Learners complain about wrong marking • Teacher check marking	• Learners exchange work • Teacher checks marking	• Learners exchange books • Mark with pencils • Teacher checks marking	• No peer assessment is done	• Pair assessment

Table 4.9(a): Individual interview responses (Ex-model C teachers: Question 5)

Type of school	Ex-model C	Ex-model C	Ex-model C	Ex-model C	Ex-model C	Ex-model C
School code	A	B	C	D	D	D
Teacher code	C1	C2	C3	C4	C5	C6
Coded responses: Question 5	Main internal obstacles regarding the implementation of AfL					
	• Making copies of work • Book shortages	• Cannot give individual attention to each learner • Learner discipline • Number of learners per class • Learners cannot follow instructions	• Number of assessment tasks • Making copies for lessons	• Time constraints • Pace of learners	• Time constraints	• Time constraints

Table 4.9(b): Individual interview responses (Township teachers: Question 5)

Type of school	Township	Township	Township	Township	Township
School code	E	E	F	F	F
Teacher code	T1	T2	T3	T4	T5
Coded responses: Question 5	Main internal obstacles regarding the implementation of AfL				
	- Overcrowded classes - Difficult to give individual attention to learners	Uncertainty	No internal problems	Time constraints	- Overcrowded classrooms - Seating arrangements not conducive to AfL

Table 4.10(a): Individual interview responses (Ex-model C teachers: Question 6)

Type of school	Ex-model C	Ex-model C	Ex-model C	Ex-model C	Ex-model C	Ex-model C
School code	A	B	C	D	D	D
Teacher code	C1	C2	C3	C4	C5	C6
Coded responses: Question 6	Main external obstacles					
	- Poor support from subject facilitators - Everything is left GPLMS coaches - GPLMS impedes on teacher innovation	- CAPS work schedule not considering slower learners - CAPS work schedule not considering teacher initiative	Lead educators for AfL not visiting schools	- No provision for AfL in CAPS - No support from lead educators for AfL	- No provision for AfL in CAPS - No support from lead educators for AfL	- No guidance provided by GDoBE - No support from lead educators for AfL - AfL only a pilot project with no follow-up

Table 4.10(b): Individual interview responses (Township teachers: Question 6)

Type of school	Township	Township	Township	Township	Township
School code	E	E	F	F	F
Teacher code	T1	T2	T3	T4	T5
Coded responses: Question 6	Main external obstacles				
	No support from district or lead educators concerning AfL	- More focus on CAPS - No support from GDoBE or lead educators on AfL	No support from lead educators for AfL	- No support from lead educators for AfL - Focus is on CAPS	- No support from the province, district or lead educators for AfL - Last school visit by AfL

4.2.4 Determining *a-priori* categories for interpreting individual interview data

As indicated in 4.2.2, the *a-priori* categories were derived from the literature review to guide the construction of the individual interview guide. The six interview questions were associated with, and clustered according to the six categories as shown in Table 4.11.

Table 4.11: *A priori* categories according to individual interview questions

Interview questions	<i>A-priori</i> categories
Which resources do you know / have available / have access to, to assist you with the implementation of assessment for learning?	Resources
Do you meet with other colleagues to discuss assessment for learning related matters? Briefly explain the nature of such discussions.	Collegial discussions
Do you get any support from the SMT of your school with regard to the implementation of assessment for learning? Briefly describe what the said support entails.	SMT support
Give a detailed account of HOW the elements of assessment for learning are implemented in your Mathematics teaching.	Implementing AfL
What are the main internal (in school) obstacles you are experiencing with regard to the implementation of assessment for learning?	Internal obstacles
What are the main external (Departmental related) obstacles you are experiencing with regard to the implementation of assessment for learning?	External obstacles

4.2.5 Interpretation of individual interviews

Corresponding with the mentioned categories as set out in Table 4.11, the coded individual interview data can be interpreted as set out below.

4.2.5.1 Resources (Question 1)

All participants indicated that adequate resources are available to implement AfL. A wide range of resources were mentioned, which includes policy documents, textbooks, various teaching and learning materials and mathematical instruments. It is evident though, that two teachers (C4, T5) were extremely vague in their answers, which suggest that they probably find it difficult to relate specific resources to AfL. It is also striking that most of the participants (C2, C3, C5, C6, T1, T2, T3, T4) mentioned textbooks as resources which, in general, points to teachers' dependence on textbooks. Only one teacher (C2) hinted to the involvement of learners to supply some resources; a practise that can certainly be related to AfL. Noteworthy is the fact that one teacher (C3) mentioned a recording book as a resource, which implies that AfL is associated with the recording of marks; a practise disproved by AfL.

4.2.5.2 Collegial discussions (Question 2)

Although one participant's response (C2) revealed that collegial discussions are restricted to colleagues from the same school, most of the participants concur that they have discussions with their colleagues. However, four participants (C6, T2, T4, T5) indicated that although these discussions were initially related to AfL, it is no longer the case, while two participants (C5, T3) stated that even though there are discussions with colleagues, such discussions are not specifically focused on AfL. Derived from the aforementioned and by considering the nature of collegial discussions mentioned by the participants, it appears as if no or little attention is given to collegial discussions on AfL related matters. Collegial discussions rather concentrate on methodological issues (C1, C2, C3, C5, T1, T2, T4); summative assessment (C2, C4, T5); the Gauteng Primary Literacy Mathematics Strategy (GPLMS), an initiative to assist underperforming schools to improve their learners' Literacy and Mathematics abilities (C3, T3); curriculum matters (C4, C5, T2) and language issues (C5).

4.2.5.3 SMT support (Question 3)

All participants reported that they get support from their SMTs. This support manifests in the following forms: encouragement to attend workshops (C1, C2, C6, T2), GPLMS and curriculum support (C3, C5, T4), AfL support (C4, T3, T5), assessment support (T1) and general support in the form of classroom visits (T5).

Inferred from the aforementioned, there is a palpable meagre support of SMTs in terms of AfL.

4.2.5.4 Implementing AfL (Question 4)

This category includes the elements of AfL which served as sub-questions: sharing learning intentions, questioning, feedback, self-assessment and peer assessment.

(i) Sharing learning intentions (Question 4.1)

The majority of the research participants reported that they share the learning intentions with their learners at the beginning of a lesson. Two teachers (C6, T1) link previously learnt content with the intentions of the new content, while two teachers (C4, C6) indicate that they write the intentions on the board. One teacher (T1) uses teaching aids to represent the learning intentions. The aforementioned participants thus allow learners to 'contextualise' and 'assimilate' the learning intentions. Respectively, only one teacher (C5) uses 'talking partners' and another (T4) reminds learners about the learning intentions during the course of a lesson. In so doing, these two teachers make provision for learners to 'internalise' learning intentions.

(ii) Questioning (Question 4.2)

According to the research participants' responses, two distinct questioning methods are used: questioning methods to encourage learner participation (C1, C2, C3, C4, C5, T1, T2) and questioning methods to stimulate higher order thinking (C1, C2, C5, C6, T2, T5). Two research participants explicitly indicated that they use questioning techniques associated with AfL: 'no hands-up' (C5) and linking questions to learning intentions (T5). One participant (T4) indicated that questioning is guided by the questions provided by the GPLMS.

(iii) Feedback (Question 4.3)

From the responses it is clear that all research participants understand feedback as information provided to learners, either in written form (C5, T3), verbal form (C2), or written and verbal form (C1, C3, C6, T2, T4, T5). Purposes of feedback included: telling learners what should be corrected and how to do it (C1), to stimulate thinking (C2) and to strengthen learning intentions and success criteria (C6). Participants

also indicated that they give individual feedback (C5, T2, T4) or group feedback (C3, T5). One teacher (T1) also mentioned that learners are encouraged to provide feedback on their peers work; thus using 'peer language'.

(iv) Self-assessment (Question 4.4)

One participant (C6) admitted that very little provision is made for self-assessment. In many cases (C1, C5, C6, T1, T3, T4) teachers verify learners' self-assessment by providing clear guidelines or by providing a checklist or by checking learners' assessment. It appears as if self-assessment is confined to either homework (C2, T2, T3, T5) or activities (T5).

(v) Peer assessment (Question 4.5)

Apparently, peer assessment is restricted to the exchange of learners' written work (C1, C3, C5, T1, T2, T3). In many cases peer assessment is verified by assessment done in pairs (C1, T5), or checking by the teacher (C3, C5 T1, T2, T3). One teacher (C2) indicated that peer assessment serve to help weaker learners. Worth mentioning is the fact that several participants (C4, C6, T4) remarked that they do not implement peer assessment since learners are weak (C4) or learners are unhappy when their work is assessed by their peers (C6).

4.2.5.5 Internal obstacles (Question 5)

Time constraints were explicitly mentioned by a number of research participants (C4, C5, C6, T4) as an internal obstacle to realise AfL. Other factors insinuating time constraints were also mentioned and included 'difficulty to attend to individual learners' (C2, T1) and 'the number of assessment tasks' (C3). Some participants referred to overcrowded classrooms (C2, T1, T5), disciplinary and language problems (C2) and insufficient learning material (C1, C3) as internal obstacles impeding on the implementation of AfL. Only one teacher (T2) alluded to uncertainty as a stumbling block towards the successful implementation of AfL.

4.2.5.6 External obstacles (Question 6)

The majority of participants (C1, C3, C4, C5, C6, T1, T2, T3, T4, T5) reported a lack of support from subject facilitators, lead educators, districts or even the province as

external obstacles hampering the implementation of AfL. Two teachers (C6, T5) mentioned that no effort was made to ensure the continuation of AfL pilot project, while others meant that the implementation of CAPS (C2, C4, C5, T2, T4) and the implementation of the GPLMS (C1) diverted teachers' attention from AfL.

4.2.6 Preliminary conclusions with regard to the interpretation of the individual interviews

Drawn from the individual interview data, the following preliminary inferences are made regarding the implementation of AfL by the research participants:

- (i) Although adequate resources are available in the sampled schools, there is uncertainty in terms of its appropriateness for AfL.
- (ii) Despite the fact that collegial discussions occur and cover a range of topics, these discussions are not related to AfL.
- (iii) Attention to AfL is not apparent in support provided by the SMTs.
- (iv) Considering the elements of AfL,
 - a) learning intentions are primarily used to introduce lessons,
 - b) questioning is aimed at encouraging learner participation and to stimulate higher order thinking,
 - c) feedback is provided in written and verbal forms but not necessarily to fill learning gaps, and
 - d) the use of self- and peer assessment is largely restricted to homework and is frequently monitored by teachers.
- (v) Time constraints and lack of departmental support are considered to be major obstacles towards the implementation of AfL.

4.3 ANALYSIS AND INTERPRETATION OF OBSERVATIONAL DATA

4.3.1 Background information

The second source of data involved observations. Observations were planned to observe Grade 5 Mathematics lessons during scheduled periods to gain deeper insight on the research participants' implementation of AfL. Consequently, one lesson, presented by each of the 11 sampled research participants, was observed by the researcher who acted as 'observer as participant' (*cf.* 1.5.2.2.4 and 3.7.2). Data for the observations were collected by means of anecdotal notes (*cf.* 1.5.2.2.4 and 3.7.2) to clarify pre-determined elements suggested for observation (*cf.* **Appendix**

F). With the observations the researcher aimed to “crystallise ... information” (Nieuwenhuis, 2012:86) and to compare it with what has emerged from the individual interview data.

4.3.2 Presentation of anecdotal observation notes

A condensed version of the researcher’s anecdotal observational notes of the sampled teachers’ lessons is reflected in Tables 4.11 (a) to 4.13 (b) on the following pages. The notes account for the six elements identified for observation.

Table 4.11(a): Observation notes (Ex-model C teachers (Elements 1 & 2))

Type of school	Ex-model C	Ex-model C	Ex-model C	Ex-model C	Ex-model C	Ex-model C
School code	A	B	C	D	D	D
Teacher code	C1	C2	C3	C4	C5	C6
Observation notes: Element 1	Classroom profile and atmosphere					
	• Class overcrowded • Groups of fours • Class disciplined • Good classroom management	• Enough floor space • Lot of teaching and learning aids • Groups of six • Class ill disciplined • Poor classroom management	• Mental mathematics • Conducive to learning • Lot of learning aids • Groups of six • Class disciplined • Good class management	• Conducive to learning • Groups of twos • Disciplined • Good classroom management	• Mental maths • Conducive to learning • Groups of twos • Disciplined • Good classroom management	• Conducive to learning • Groups of twos • Disciplined • Good classroom management
Observation notes: Element 2	Sharing learning intentions					
	• Introduction of the lesson • Learners involved • Learning intentions not repeated	• Mental Mathematics • Learning intentions shared • Not repeated	• No sharing of intentions • Learners involved • No reminded about intentions	• Intentions shared • Intentions repeated throughout • Talking partners • Learners involved	• At the beginning • Throughout the lesson • Learners involved	• Introduction • Talking partners • Learners involved

Table 4.11(b): Observation notes (Township teachers (Elements 1 & 2))

Type of school	Township	Township	Township	Township	Township
School code	E	E	F	F	F
Teacher code	T1	T2	T3	T4	T5
Observation notes: Element 1	Classroom profile and atmosphere				
	- Overcrowded - Groups of six - Not conducive to learning - No teaching aids - Poor classroom management	- Enough floor space - Groups of six - Class disciplined - Good classroom management	- Enough space - Groups of six - Limited learning aids - Good classroom management	- Overcrowded - Seating in rows - Class disciplined - Good classroom management	- Conducive to learning - Groups of six - Disciplined - Good classroom management
Observation notes: Element 2	Sharing learning intentions				
	- Only once - Question and answer method	- Intentions shared - Learners involved - Discussions	- Intentions shared - Throughout the lesson - Learners involved	- Intentions shared - Throughout the lesson - Learners involved	- Written on the board - Learners involved

Table 4.12(a): Observation notes (Ex-model C teachers (Elements 3 & 4))

Type of school	Ex-model C	Ex-model C	Ex-model C	Ex-model C	Ex-model C	Ex-model C
School code	A	B	C	D	D	D
Teacher code	C1	C2	C3	C4	C5	C6
Observation notes: Element 3	Verbal questioning					
	• No waiting time • Teacher centred lesson • Teacher asks questions, learners respond	• Teacher ask question • No waiting time • Pointed to learners whose hands were up • Teacher centred • Bloom levels not evident	• No AfL questions techniques used • Question and answer method • Answer at the same time (chorus answering)	• Throughout the lesson • No waiting time • Teacher support (e.g. rephrasing questions)	• Questions techniques used (e.g. follow-up questions) • No waiting time • Teacher centred	• Questions techniques used (e.g. clarifying questions) • No waiting time • No hands up technique used • Learners involved by asking questions
Observation notes: Element 4	Feedback					
	• No clear feedback • No learner support	• No feedback • No learner support	• Teacher and learner feedback • Learners explaining Maths concepts	• Verbal feedback • Learner presentation • Learner support	• Verbal feedback • Learner support	• Verbal feedback • Learner support • Throughout the lesson

Table 4.12(b): Observation notes (Township teachers (Elements 3 & 4))

Type of school	Township	Township	Township	Township	Township
School code	E	E	F	F	F
Teacher code	T1	T2	T3	T4	T5
Observation notes: Element 3	Verbal questioning				
	- Traditional question and answer method - Answer at the same time (chorus answering)	- Questions techniques used - No waiting time - No hands up technique used - Learners involved by asking questions	- No waiting time - No hands up technique used - Learners involved by asking questions - Question and answer method	- Different question techniques - No hands up - Waiting time - Learners involved - Bloom levels not evident	- Different question techniques - No hands up - Waiting time - Learners involved (talking partners)
Observation notes: Element 4	Feedback				
	No feedback	- Verbal feedback - Learner support - Throughout the lesson - Motivation	- Verbal feedback - Learner support - Individual feedback	- Verbal feedback - Learner support - Throughout the lesson - Motivation	- Verbal feedback - Learner support - Throughout the lesson - Motivation

Table 4.13(a): Observation notes (Ex-model C teachers (Elements 5 & 6))

Type of school	Ex-model C	Ex-model C	Ex-model C	Ex-model C	Ex-model C	Ex-model C
School code	A	B	C	D	D	D
Teacher code	C1	C2	C3	C4	C5	C6
Observation notes: Element 5	Self-assessment					
	- At the end of the lesson - Learners marking their own work	No self-assessment	No self-assessment	No self-assessment	- Traffic light used - Teacher guidance - Only once	- Traffic light used - Teacher guidance - Only once - Teacher support
Observation notes: Element 6	Peer assessment					
	- No peer assessment - No guidance	- No peer assessment - No guidance	- No peer assessment - No guidance	- Working in groups - Presentations on the board	- Learner demonstration - Peers assess on demonstration of measurement	- No peer assessment - No guidance

Table 4.13(b): Observation notes (Township teachers (Elements 5 & 6))

Type of school	Township	Township	Township	Township	Township
School code	E	E	F	F	F
Teacher code	T1	T2	T3	T4	T5
Observation notes: Element 5	Self-assessment				
	• No self-assessment	• No self-assessment	• No self-assessment	• No self-assessment	• No self-assessment
Observation notes: Element 6	Peer assessment				
	• No peer assessment • No guidance	• Learner presentation of answers • Working in groups	• No peer assessment • No guidance	• Learner demonstration • Presentation	• Group assessment • Talking partners • Learner presentation of answers

4.3.3 Interpretation of observations

Corresponding with the mentioned elements, the observational data can be interpreted as set out below.

4.3.3.1 Classroom profile and atmosphere (Element 1)

With the exception of one classroom (T1), the observed classrooms signified environments conducive to learning. In some cases classes are overcrowded (C1, T1, T4). Generally, learners work in groups, ranging from two to six learners per group, while only one class (T4) was observed where learners were seated in rows. Good classroom management was observed in most classes, with the exception of C1, C2 and T1. By and large, good classroom management also filtered through to well-disciplined classes. While the researcher's attention was drawn to noteworthy teaching and learning aids in only two cases (C2, C3), it was also striking that no teaching and learning aids were used in one of the classes (T1).

4.3.3.2 Sharing learning intentions (Element 2)

In all observed classrooms, excluding one (C3), learning intentions were shared. The intentions were mostly shared at the beginning of the lesson (C1, C2, C5, C6, T1). In four cases (C4, C5, T3, T4) the learning intentions were repeated, or learners were reminded (T5) about them throughout the lesson. In some or other way, learners were involved with the sharing of intentions in almost all classes.

4.3.3.3 Verbal questioning (Element 3)

Although verbal questioning was observed in all classrooms, teachers approached it in their own unique ways. Provision was made for the rephrasing of questions (C4) and for follow-up questions (C5, C6) to stimulate learners' thinking. However, variations of questions according to Bloom's levels of cognition were not evident. For most parts during the observed lessons, the teachers initiated the questions, but in some cases (C6, T2, T3) learners also asked questions. These questions were, however, predominantly clarifying questions. Remarkable was the fact that little provision was made for waiting time (C1, C2, C4, C5, C6, T2, T3), which was only observed in two cases (T4, T5). Learners' answers were mostly treated as individual efforts, though in two classes learners answered the teachers' questions in a chorus

(C3, T1). The AfL technique of 'no hands up' was observed in in several classes (C6, T2, T3, T4, T5).

4.3.3.4 Feedback (Element 4)

No written feedback during the lesson observations was witnessed; however, verbal feedback was observed (C4, C5, C6, T2, T3, T4, T5). In one case (C3) teacher and learner feedback was observed. In some cases the observed feedback was directed at learner explanations or learner presentations (C3, C4), while it was also intended to provide learner support or to motivate learners (C4, C5, C6, T2, T3, T4, T5). In only four occasions (C6, T2, T4, T5) the researcher was aware that feedback formed part of the entire lesson. The researcher was surprised that no feedback was performed in four of the observed lessons (C1, C2, C3, T1).

4.3.3.5 Self-assessment (Element 5)

In the majority of the lessons (C2, C3, C4, T1, T2, T3, T4, T5) no self-assessment was observed. In the other cases self-assessment was either performed at the end of the lesson where learners marked their own work (C1) or once during the lesson by means of 'traffic lights' (C5, C6).

4.3.3.6 Peer assessment (Element 6)

Repeating the observed trend detected in terms of self-assessment in 4.3.3.5, peer assessment is implemented very rarely. In cases where peer assessment was observed, it was mostly done in group context (C4, T2, T5) and it focused primarily on learner presentations or learner demonstrations (C4, C5, T2, T4, T5). In only one observation the researcher detected a typical AfL peer assessment technique: 'talking partners' (T5). In several cases (C1, C2, C3, C6, T1, T3), the researcher resolved that although opportunities for peer assessment present itself, the observed teachers do not attempt to guide learners towards its implementation.

4.3.4 Preliminary conclusions with regard to the interpretation of the observations

Derived from the data obtained during the lesson observations, the following preliminary conclusions with regard to the research participants' implementation of AfL are extrapolated:

- (i) The observed classrooms represented favourable learning environments where good classroom management and group work were the norms, but the use of teaching and learning aids was disheartening.
- (ii) Learning intentions are generally shared at the beginning of lessons by involving learners.
- (iii) On the whole, teachers asked questions and expect individual learners to respond without allowing for sufficient waiting time.
- (iv) Verbal feedback was essentially provided to support or motivate learners.
- (v) Self- and peer assessment were rarely implemented.

4.4 ANALYSIS AND INTERPRETATION OF FOCUS GROUP INTERVIEWS

4.4.1 Background information

With regard to the focus group interviews, one school from each type (ex-Model C or Township) with the most teachers involved in the research was purposively identified, since it was argued that less than three teachers are not viable for the purpose of a focus group interview. Three teachers of each of the two types of schools participated in the focus group interviews (*cf.* 1.5.2.2.3 and 3.6). The main intention of the focus group interviews was to gather evidence on the research participants' comprehension of AfL (*cf.* 1.5.2.2.4).

4.4.2 Analysis and interpretation of focus group interview data

The focus group data were also captured and archived on audio tape. By following the same procedures as for the individual interviews (transcribing, memoing, open coding, bracketing, inter-coder verification) (*cf.* 4.2.2), the transcribed data were grouped together under *a priori* categories derived from the literature. The reason why the *a priori* categories for the focus group interviews differ from those of the individual interviews, is because of the different angle (comprehension as opposed to implementation), from which the primary research question is viewed.

4.4.3 Presentation of coded focus group interview data

Derived from the responses of the participants, the raw transcribed data of the focus group interviews reflect the coded accounts for each of the five focus group interview questions (*cf.* **Appendix G**) The coded data are presented in Table 4.14 on the following pages.

Table 4.14: Focus group interview responses

Type of school	Ex-model C	Township
School code	D	F
Group code	1	2
Coded responses : Question 1	Inclusion in the AfL pilot project introduced by the GDE in 2006/7	
	• Yes • Whole school participated in the project • All teachers were part of the project	• Yes • Whole school participated in the project
Coded responses: Question 2	Understanding of AfL	
	• Learner-centred • Opens up communication • Learners responsible for their own learning • Learners inform teacher if they do not understand • Learners talk to each other	• Involve learners in their own learning • AfL is formative assessment • Both teachers and learners receive feedback on the lesson
Coded responses: Question 3	Valuing AfL in terms of effective learning	
	• Creates a conducive learning atmosphere • Learner-centred • Exposes learner potential	• Improves reading, writing and Mathematics • Learners' concentration level is higher • Creates a positive learning environment • Motivates learners

Table 4.14: Focus group interview responses (cont.)

Type of school	Ex-model C	Township
School code	D	F
Group code	1	2
Coded responses: Question 4	Valuing AfL as complementing Assessment <i>of</i> learning	
	• AfL definitely complements assessment <i>of</i> learning • If AfL (formative assessment) is done correctly then assessment <i>of</i> learning (summative assessment) is much easier	• AfL is building up for assessment <i>of</i> learning • AfL is process-oriented and assessment <i>of</i> learning is product-oriented • Assess during (formative) and assess after the lesson (summative)
Coded responses: Question 5	Valuing AfL in terms of learner progress in Mathematics	
	• AfL creates a positive learning environment • Involvement of all learners • Talking partners improve understanding • Provides a support base for learners and teachers	• Learner progress is stimulated • Learners' reasoning skills are improved • Learners reflect on their understanding • Learners are still afraid to try

4.4.4 Determining *a-priori* categories for interpreting focus group interview data

As indicated in 4.4.2, the *a-priori* categories were derived from the literature review to guide the construction of the focus group interview guide. The five interview questions were associated with, and clustered according to the three categories as shown in Table 4.15.

Table 4.15: *A priori* categories according to focus group interview questions

Interview questions	<i>A-priori</i> categories
Were you part of the assessment <i>for</i> learning pilot project introduced by the GDE in 2006/7? If not, were you introduced to assessment <i>for</i> learning and by whom?	Introduction to AfL
Briefly outline your understanding of assessment <i>for</i> learning.	Understanding of AfL
How do you value assessment <i>for</i> learning in terms of effective learning?	Valuing AfL
How do you value assessment <i>for</i> learning as complement of assessment <i>of</i> learning?	
How do you value assessment <i>for</i> learning in terms of learner progress in Mathematics?	

4.4.5 Interpretation of focus group interviews

Corresponding with the mentioned categories as set out in Table 4.15, the coded focus group interview data can be interpreted as set out below.

4.4.5.1 Introduction to AfL (Question 1)

Both focus groups indicated that their schools, and not individual teachers, participated in the AfL pilot project launched by the Gauteng Department of Education in 2006/2007.

4.4.5.2 Understanding of AfL (Question 2)

The focus groups were in agreement that learners, interaction and learning are the focal points of AfL. Focus group F2 revealed that AfL is akin to formative assessment.

4.4.5.3 Valuing AfL (Questions 3 to 5)

This category encapsulates the value research participants attach to AfL in terms of effective learning, as complement of assessment *of* learning (AoL) and learner progress in Mathematics. As far as effective learning is concerned, it was suggested that AfL creates an encouraging learning environment (D1, F2) in which learner potential becomes easily visible (D1), and in which learners are more focused and motivated (F2). Both focus groups disclosed that assessment should be seen as a continuous process in which formative and summative assessment are complementary. Hence, the research participants value the harmony between AfL and AoL. With specific reference to the value of AfL in terms of learner progress in Mathematics, it was revealed that through the involvement of all learners, AfL improves understanding and acts as a support base (D1). In addition, AfL improves learners' reasoning skills and their ability to reflect; whereby learner progress is stimulated (F2). It was also mentioned though, that the implementation of AfL in the Mathematics classroom requires patience since some learners are still anxious to reveal their ignorance (F2).

4.4.6 Preliminary conclusions with regard to the interpretation of the focus group interviews

Preliminary conclusions with regard to the research participants' comprehension of AfL as uncovered in the focus group interviews, are as follows:

- (i) Since the AfL pilot project was aimed at schools and not individual teachers, it can be assumed that the implementation of AfL and the success thereof, should be regarded as a school effort.
- (ii) The research participants' understanding of AfL matches the established theoretical information of available literature to a reasonable extent.
- (iii) The research participants shows an awareness of the possible benefits of AfL and value it in terms of effective learning, as complement of AaL and invigorating learner progress in Mathematics.

4.5 CONCLUSION

This chapter focused on the empirical part of this study which was guided by the two secondary research questions (*cf.* 4.1). The qualitative data, obtained by means of individual interviews, observations and focus group interviews were presented, analysed and interpreted. The interpretation of each set of data was ended by preliminary conclusions which served as a synopsis of the most significant interpretations derived from the respective sets of data. In the following chapter, an overview of the study will be provided, the critical findings of the research will be highlighted and recommendations, stemming from the findings, will be proposed.

CHAPTER FIVE

FINDINGS, RECOMMENDATIONS AND CONCLUSIONS

5.1 INTRODUCTION

The purpose of this qualitative study was to determine to what extent is assessment *for* learning comprehended and implemented by selected Gauteng primary school Mathematics teachers. In addition to this purpose, a number of related secondary research questions and objectives were formulated (*cf.* 1.3.2). These were addressed by means of a literature and empirical study.

In this chapter, an overview of the study will be provided by relating the gathered information to the respective secondary questions, objectives and ultimate purpose of the study. An account of the most prominent findings from the literature and empirical study will be provided with a view to formulate recommendations for both practical educational practice. The chapter will conclude by recognising limitations of the research and by making suggestions for further research.

5.2 AN OVERVIEW OF THE STUDY

By considering the purpose and objectives of the study, the respective chapters of the study can be summarised as outlined in the subsequent sub-sections.

5.2.1 Chapter one

This chapter provided an orientation to the study. The study was introduced and justified by sketching the initiative of the GDoBE to introduce AfL to guide teachers' classroom practice and to improve learners' performance. However, due to the perception that summative assessment dominates teachers' assessment practise (*cf.* 1.1), the study was initiated by the researcher's interest to explore the comprehension and implementation of AfL by selected Gauteng primary school Mathematics teachers that participated in the AfL pilot project of the GDoBE (*cf.* 1.2). Several secondary research questions and concomitant objectives were formulated to guide the study process (*cf.* 1.3), after which essential concepts on which the study centred were

clarified (*cf.* 1.4). The research methodology was outlined (*cf.* 1.5), followed by an inventory of delimitations of the study (*cf.* 1.6). The significance and possible contribution of the study (*cf.* 1.7) as well as possible challenges (*cf.* 1.8) were considered. The chapter concluded with an outlay of how the study will proceed (*cf.* 1.9).

5.2.2 Chapter two

Three secondary research questions guided the discussion, based on a literature study, in this chapter:

- How is assessment **for** learning defined and characterized within the context of educational assessment?
- How is assessment **for** learning justified in terms of learning and learner achievement?
- How is Mathematics as subject positioned within the South African school curriculum?

The discussion commenced with a contextualisation of assessment within recent educational reforms in South Africa (*cf.* 2.2). Thereafter, constructivism and scaffolding as features of the South African school curriculum were examined (*cf.* 2.3). A detailed discussion on assessment followed in an attempt to clarify and position AfL in the context of educational assessment, learning and learner achievement (*cf.* 2.4). The remainder of the chapter was devoted to discuss Mathematics as school subject within the South African school curriculum (*cf.* 2.5) and to justify AfL in the Mathematics classroom (*cf.* 2.6).

5.2.3 Chapter three

Chapter three provided an overview of the empirical study to indicate the processes and procedures which were followed to gather empirical evidence to answer the following two secondary research questions:

- To explore how AfL is comprehended by selected Gauteng primary school Mathematics teachers.

- To explore the degree to which AfL is implemented by selected Gauteng primary school Mathematics teachers.

Interpretivism as the chosen research paradigm was illuminated (*cf.* 3.3), while it was also explained that the study was founded on a qualitative research design (*cf.* 3.4) and a multiple case study as strategy of inquiry (*cf.* 3.5). The population and sampling (*cf.* 3.6) were discussed, followed by a detailed outline of the data collection methods (*cf.* 3.7) which included individual interviews, observations and focus group interviews. The quality criteria that were observed were discussed (*cf.* 3.8), where after the pilot study (*cf.* 3.9) and the role of the researcher (*cf.* 3.10) were attended to. The ethical considerations that guided the study were clarified in section 3.11. The chapter was wrapped up by presenting an overview of the data collection process in a visual form (*cf.* 3.12).

5.2.4 Chapter four

Based on the information provided in the previous chapter, chapter four focused on the presentation, analysis and interpretation of the collected data in order to address the primary research question (*cf.* 1.3.1):

To what extent is assessment *for* learning comprehended and implemented by selected Gauteng primary school Mathematics teachers?

Infused in the primary question were the two last secondary research questions (see 5.2.3 above).

Because of the qualitative nature of the research, provision was made for data triangulation by utilising multiple data collection instruments (*cf.* 3.8). Based on the order in which the data were collected, a detailed discussion on the analysis and interpretation of the data collected through the respective instruments followed. Background information related to the data collected through each instrument was given (*cf.* 4.2.1; 4.3.1 and 4.4.1) and was followed by the analysis and interpretation of data obtained through the respective instruments. Preliminary conclusions with regard to the data relevant to each instrument were also made (*cf.* 4.2.6; 4.3.4 and 4.4.6).

5.3 SUMMARY OF FINDINGS FROM THE LITERATURE STUDY AND THE EMPIRICAL RESEARCH

By considering the overall purpose of the study, this section presents a summarised version of the most significant findings from the literature study as well as from the empirical research.

5.3.1 Summary of findings originating from the literature study

The intention of a literature study is to provide a theoretical framework on which the empirical research could be based. Thus, the literature study and the conclusions drawn from it are important since it can enlighten the empirical findings. For the purpose of this study, three secondary research questions guided the literature study (*cf.* 2.1).

To enable the researcher to arrive at meaningful answers to these three questions, AfL was defined, characterised and justified in the context of educational assessment, learning and learner achievement. Assessment was further contextualized within recent South African educational reforms, by also attending to constructivism and scaffolding as features of the South African school curriculum. In addition, the concept assessment was interrogated to gain a better understanding of AfL. Attention was also given to the nature and position of Mathematics as school subject in the South African school curriculum. From the literature study the following findings have direct bearing on the purpose of the research and are worth mentioning:

- Although assessment is regarded as a critical element in the South African school curriculum (*cf.* 2.2.4), assessment policies and practises are characterised by a domination of summative assessment or assessment **of** learning (*cf.* 2.3.3). This results in the unfortunate fact that ‘constructivist education’ (*cf.* 2.3.1) and ‘scaffold learning’ (*cf.* 2.3.2) remain mere phrases on paper. Thus, it can be concluded that the South African school education system is not geared to realise the ideals of learner-centred, activity-based and achievement-oriented education to nurture the development of independent, self-regulated learners.

- Whereas AoL is product-oriented and related to summative assessment, AfL is process-oriented and related to formative assessment. AfL intends to assist learners in their learning (*cf.* 2.4.6.2) by also involving them in their own learning processes. The successful implementation of AfL centres on the sharing of learning intentions, questioning, feedback, peer and self-assessment and the formative use of summative assessment results. It can thus be concluded that AfL has the potential to stimulate classroom discourse (*cf.* 2.6) which could result in the development of independent, self-regulated learners.
- The importance attached to Mathematics in the South African school curriculum is evident in the various curriculum documents. Noteworthy is the fact that Mathematics is not only taught at school level to expand learners' knowledge and skills, but also with the intention to enable learners to contribute and participate confidently in society (*cf.* 2.5.2). Therefore, it can be concluded that the ways in which Mathematics are taught and assessed are imperative for building learners' Mathematical confidence.

5.3.2 Summary of findings originating from the empirical research

Embedded in the primary research question (*cf.* 1.3.1) were the following two secondary research questions (*cf.* 1.3.2):

- To explore how AfL is comprehended by selected Gauteng primary school Mathematics teachers.
- To explore the extent to which AfL is implemented by selected Gauteng primary school Mathematics teachers.

Related to these secondary questions, the empirical research as outlined in chapter three, revealed the important findings as stated below. It should be noted that the presentation of these findings are not necessarily ordered in the same sequence used in presenting the interpreted data and preliminary findings in chapter four, but that the order was directed by the sequence in which the two secondary research questions initially appeared (*cf.* 1.3.2). Furthermore, the researcher tried to follow a 'logical' order in which the findings are reported.

- Considering the **comprehension** of AfL by the selected teachers, the results show that the participants regarded learners, interaction, learning (*cf.* 4.4.5.2), and learner development or improvement (*cf.* 4.4.5.3) as central to AfL. The research participants agreed that assessment should be seen as a continuous process and that there should be a balance between formative and summative assessment. They also showed an awareness of the relation between formative assessment and AfL on the one hand, and summative assessment and AoL on the other. It can therefore be concluded that the research respondents are reasonably conversant with the notion of AfL.
- In as far as the **implementation** of AfL is concerned, the research results revealed the findings below.
 - AfL was meant to be implemented by whole schools and not by individual teachers (*cf.* 4.4.5.1 and 4.4.6. (i)). However, research participants indicated that collegial discussions do not necessarily focus on AfL matters (*cf.* 4.2.5.2) while only meagre support in terms of AfL is provided by SMTs (*cf.* 4.2.5.3). Support of District officials is almost totally absent (*cf.* 4.2.5.6). This implies an inadequacy in terms of support to implement and sustain AfL successfully.
 - Although a number of impeding factors on the implementation of AfL were mentioned, time constraints appear to be the most problematic (*cf.* 4.2.5.5). An apparent over reliance on textbooks (*cf.* 4.2.5.1) and the use of uninspiring resources (*cf.* 4.3.3.1) discloses the research participants' uncertainty in terms of appropriate sources for AfL (*cf.* 4.2.6 (i)).
 - The research participants also hinted to the fact that the implementation of AfL was further hampered by the introduction of CAPS and the GPLMS (*cf.* 4.2.5.3 and 4.2.5.6). This shows that if too many changes are introduced too rapidly, teachers may be affected negatively. Among others, teacher competence may be affected since the gathering of in-depth knowledge or skills is sacrificed due to insufficient time. Teacher attitudes may also be affected since too much too soon may raise aversion to any kind of change.
 - In as far as the elements of AfL are concerned, the following results captured the researcher's interest. *Learning intentions* are more often shared at the

beginning of lessons than during lessons (*cf.* 4.2.5.4 (i)) by involving learners in some or other way (*cf.* 4.3.3.2). *Questioning* is used to encourage learner participation and to stimulate thinking (*cf.* 4.2.5.4 (ii) and 4.3.3.3). Only a few questioning techniques for enhancing the quality of teachers' questions and learners' answers (*cf.* 2.4.6.2.2) are applied by the participants (*cf.* 4.2.5.4 (ii) and 4.3.3.3). Although teachers reported that they provide written and verbal *feedback*, it appears as if feedback is mostly given in verbal form which is specifically aimed at the motivation of learners (*cf.* 4.2.5.4 (iii) and 4.3.3.4). *Peer and self-assessment* are implemented with extreme caution and are often verified by teachers (*cf.* 4.2.5.4 (iv), (v)). Generally, peer and self-assessment are applied with regard to learners' homework, presentations or demonstrations (*cf.* 4.3.3.5 and 4.3.3.6).

- In conclusion it can be stated that although the research participants displayed a satisfactory level of comprehension of AfL, the implementation of AfL could definitely be improved. Moreover, considering the fact that this research used Mathematics as platform to explore the comprehension and implementation of AfL (*cf.* 2.1 and 3.6), the researcher finds it rather discouraging that the research participants did not confidently utilize AfL to develop the "mental processes" (*cf.* 2.5.2) of learners.

5.4 RECOMMENDATIONS

Derived from the findings discussed in 5.3, the researcher recommends the following:

- Educational changes should be properly planned, introduced, supported and monitored. Teachers should be consulted and involved as from the early planning stages of intended changes since they have first-hand, practical experience which can be tapped for valuable inputs.
- Education authorities, such as District officials, should be appointed by following more rigorous processes. Applicants' knowledge, skills and attitudes should be of such a quality that they are positioned to share information with and provide support to teachers in a sensible, competent and timely manner.

- Educational policies regarding assessment should be revisited to make provision for a balanced assessment system in a more vibrant manner.
- Professional learning communities should be promoted at school level to allow teachers to share their best practices for improving teaching, learning and assessment.
- Starting at the lower grades of schooling, the image of assessment as educational 'by-product' and deterrent should be changed.
- Whereas assessment should manifest more clearly in teacher education curricula, practicing teachers also need to be re-trained with regard to assessment.
- AfL should be introduced more vigorously to realise the ideals of constructivist and scaffold learning in all subjects, but more particularly in a subject like Mathematics.

5.5 LIMITATIONS OF THE STUDY

Since possible weaknesses may be identified in any research, research results should always be treated as conditional. In the case of this study, the researcher became aware of some limitations that need to be mentioned.

- The study focused only on a small group of teachers (Grade 5 Mathematics teachers) who were situated in certain areas (Johannesburg-West, Johannesburg-North and Ekurhuleni-South districts). A potentially bigger group of research participants teaching other subjects at other levels and who are located in different areas may respond differently to the research question. The generalizability of the research results are thus at stake.
- Due to the researcher's position in the Department of Basic Education at the time of the research, the research participants' responses and actions may have been influenced.
- The study was approached from a qualitative angle. A quantitative or mixed methods research design could have yielded other or additional results.

- Although the researcher is used to conduct interviews, it was realised that prompting skills could be improved to enable interviewees to clarify or expand on their responses.
- The observation schedule was too comprehensive, and the researcher found the observations challenging. The assistance of a co-observer or extended observations could have helped to obtain more reliable information.
- The researcher relied only on teachers' inputs. The inputs of SMT members or even learners could have enriched the research results.
- Teachers' attitudes towards AfL were only implied. Since attitudes can be considered to be a powerful determining factor, teachers' attitudes towards AfL could have been established to inform the implementation of AfL.

5.6 RECOMMENDATIONS FOR FURTHER RESEARCH

The current research sensitised the researcher about issues that can be considered for further research. In this regard, the following are worth mentioning:

- As the research has been conducted in only three districts of the Gauteng Province, similar research can be done in other districts to obtain a clearer picture on teachers' understanding and implementation of AfL.
- The research was conducted in Mathematics classes only, yet the GDoBE pilot project included all subjects in Grade 5 (primary schools) and Grade 10 (secondary school). It will be interesting to see if the findings will be the same in other Grade 5 subjects and in the secondary schools.
- A study can be conducted to investigate why the Gauteng Department of Basic Education decided not to provide further support to the schools after the AfL project was successful piloted.
- Research on assessment **of** learning is also needed to consolidate the findings of assessment **for** learning.
- Teachers' attitudes towards assessment and AfL in particular, deserves research.

- Teachers' assessment literacy should be investigated to determine its impact on their assessment practises.
- Research of AfL should be extended to Higher Education Institutions.
- The elements of AfL (sharing learning intentions, questioning, feedback and peer and self-assessment), are all fields in their own right that warrants research.
- Longitudinal research can be done to monitor the real impact of the proper implementation of AfL on learner performance; perhaps more specifically so in Mathematics.
- Research could be done to determine how AfL transforms into AoL – meaning how AfL fosters learners' metacognitive skills to become self-regulated learners.

5.7 FINAL CONCLUSION

In the final analysis, and based on the findings mentioned in 5.3, the researcher concludes that the introduction of AfL only resulted in teachers' reasonable comprehension of the phenomenon, but not to the successful implementation thereof. As a consequence, it seems fair to assume that South African teachers are bombarded by information, but that various obstacles prevent the operationalization of such information. This unfortunate situation is not only costly in financial terms, but also in terms of teacher commitment to successful teaching and learning. In addition, learners are not reaping the fruits of a so called 'effective' education system. Though initiatives such as the implementation of AfL is welcomed, education authorities should realise that too many initiatives could derail the noble purposes of such initiatives.

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education
Department: Education
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For administrative use:
Reference no. : D2013/112

GDE RESEARCH APPROVAL LETTER

Date:	28 June 2012
Validity of Research Approval:	28 June 2012 to 30 September 2012
Name of Researcher:	Mvelase N.B.
Address of Researcher:	PO Box 1755
	Vereeniging
	1930
Telephone Number:	016 981 1819 / 084 369 2246
Fax Number:	016 981 1819
Email address:	Ngozamy@Telkom.net
Research Topic:	An exploration of the comprehension and implementation of Assessment for learning by selected primary school Mathematics teachers
Number and type of schools:	SIX Primary schools
District/s/HO	Ekhuruleni South; Johannesburg North and Johannesburg West

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.

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

1. The District/Head Office Senior Manager/s concerned must be presented with a copy of this letter that would indicate that the said researcher/s has/have been granted permission from the Gauteng Department of Education to conduct the research study.

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Office of the Director: Knowledge Management and Research

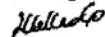
8th Floor, 111 Commissioner Street, Johannesburg, 2001
P.O. Box 7710, Johannesburg, 2000 Tel: (011) 355 0506
Email: David.Makhado@gauteng.gov.za
Website: www.education.gpg.gov.za

Makhado

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.
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 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

2012/06/28

Director: Knowledge Management and Research

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Office of the Director: Knowledge Management and Research

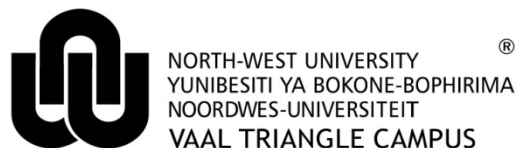
9th Floor, 111 Commissioner Street, Johannesburg, 2001
P.O. Box 7710, Johannesburg, 2000 Tel: (011) 355 0508
Email: David.Makhado@gauteng.gov.za
Website: www.education.gpg.gov.za

Minutes of the electronic NWU Ethics Sub-Committee meeting for Social and Behavioural Sciences (Faculty Humanities) held on 27 August 2012.

Ethics application: School of Education Sciences

FH-SB-2012-0025

Candidate:	N Mvelase
Supervisor:	Prof BJJ Lombard
Title:	An exploration of the comprehension and implementation of assessment for learning by selected primary school mathematics teachers.
Decision:	Ethic clearance approved in principle
Outstanding Issues:	Draft questions for focus group and individual interviewers should be submitted to chairperson for review when ready.



PO Box 1174, Vanderbijlpark
South Africa, 1900

Tel: 016 910-3111
Fax: 016 910-3116
Web: <http://www.nwu.ac.za>

The Principal

.....

.....

.....

Dear Sir/Madam

RE: Research at your school

I am currently busy with my MEd studies in Education at the above-mentioned institution and would like to use your school for conducting my empirical research. The research aims at determining to what extent assessment for learning (AfL) is comprehended and implemented by selected Gauteng primary school Mathematics teachers. Application has also been made for the research to be done with the Gauteng Department of Education.

Could you please confirm as to whether your school would be available for interviewing and observe teachers teaching Mathematics in Grade 5 who participated in the pilot project on AfL organized by the Gauteng Department of Education. Once your permission is given, arrangements will be made with the concerned parties to participate in interviews after school hours and to be observed during a lesson.

Feedback will be provided to the school after the research has been completed. For any additional information or questions, please feel free to contact me or my supervisor at the numbers below.

Yours sincerely.

N Mvelase (Student nr. 22037284)

Contact details:

N Mvelase: 0843692246

Prof BJJ Lombard 016 910 3067

INFORMED CONSENT (EDUCATOR)

Dear Educator

I am busy with research for my MEd-degree. I need your assistance to provide me with information to complete the study. This document will provide you with information regarding the project and what your involvement will entail. If you feel comfortable with the contents of the explanation I will appreciate it if you could sign the section indicating your consent to take part in the study.

Kindly note the following before you give consent to participate in the project.

The aim of the research is to determine to what extent is assessment for learning (AfL) comprehended and implemented by selected Gauteng primary school Mathematics teachers. The research results could assist in the improvement of teachers' formative assessment practices which, in turn, could help to enhance learners' learning.

With the assistance of your school principal you were identified to participate in the research. However, your permission is required to take part in the research.

Your participation is required to obtain the inputs of teachers teaching Mathematics in Grade 5 who participated in the pilot project on AfL organized by the Gauteng Department of Education, regarding their comprehension and implementation of AfL by means of focus group and individual interviews as well as observations. The interviews will take place after school hours and will not take longer than 30 minutes. Please note that the intention of the interviews and observations is NOT to evaluate **your** comprehension and implementation of AfL, but to gather information-rich research information which will help the researcher to understand the mentioned phenomena better.

Participation in the research is not compulsory and you may withdraw at any time should you feel uncomfortable. Be assured that your inputs will be used for research purposes only and that your participation will be treated confidentially.

There are no direct benefits for taking part in the study. However, the findings of the research may in future assist teachers and learners as indicated above.

The research is conducted by a Masters student, N Mvelase, under the supervision of Prof BJJ Lombard from the School of Educational Sciences, North-West University (Vaal Triangle Campus). If you have any questions or queries you can contact Prof Lombard at 016 910 3067 (work) or myself at 0843692246.

CONSENT:

I..... (full name) have read and understand the nature of my participation in the project and agree to participate.

Signature:.....

Date:.....

Interview Schedule: Individual interviews

1. Which resources do you know / have available / have access to, to assist you with the implementation of Assessment for Learning?
2. Do you meet with other colleagues to discuss Assessment for Learning related matters? Briefly explain the nature of such discussions.
3. Do you get any support from the SMT of your school with regard to the implementation of Assessment for Learning? Briefly describe what the said support entails.
4. Give a detailed account of HOW the following elements of Assessment for Learning are implemented in your Mathematics teaching:
 - 4.1 Sharing learning intentions
 - 4.2 Questioning
 - 4.3 Feedback
 - 4.4 Self-assessment
 - 4.5 Peer assessment
5. What are the main internal (in school) obstacles you are experiencing with regard to the implementation of Assessment for Learning?
6. What are the main external (Departmental related) obstacles you are experiencing with regard to the implementation of Assessment for Learning?

Observation check list

1. Classroom profile and atmosphere (Class composition and size; seating arrangement, teacher tolerance, interaction patterns, learner discipline and classroom management).
2. Sharing learning intentions (when, how, comprehension level, learner involvement, recurrence).
3. Verbal questioning (phrasing, frequency, waiting time, learner involvement, teacher actions).
4. Feedback (nature, learner support, frequency).
5. Self-assessment (nature, frequency, teacher guidance).
6. Peer assessment (nature, frequency, teacher guidance).

Interview Schedule: Focus group interviews

1. Were you part of the Assessment for Learning pilot project introduced by the GDE in 2006/7? If not, were you introduced to Assessment for Learning and by whom?
2. Briefly outline your understanding of Assessment for Learning.
3. How do you value Assessment for Learning in terms of effective learning?
4. How do you value Assessment for Learning as complement of Assessment of learning?
5. How do you value Assessment for Learning in terms of learner progress in Mathematics?