Teachers' practices of 'cooperative learning' instructional technique in six schools: Implications for learner performance in Mathematics.

by

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DECLARATION

I, PAPAMA FEBANA (Student Number: 200804853), hereby solemnly declare that the dissertation, "*Teachers' practices of 'cooperative learning' instructional techniques in six schools: Implications for learners' performances in mathematics",* which was submitted for the fulfilment of the requirements for the degree of Master of Education at the University of Fort Hare is my own unaided original work and that all sources used have been indicated and acknowledged by means of complete references. Furthermore, it has not been submitted previously in any form or at any other university or duplicated in whatever manner. It represents my own opinions and not necessarily those of the University of Fort Hare.

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ABSTRACT

One of the key features of curriculum change in South Africa in the last twenty years has been a move away from teacher centred instructional techniques to those that promote active participation of learners in their learning. Although the post democratic National Curriculum Statement has put emphasis on the importance of cooperative learning as a learner centred instructional technique, there is hardly any research on how teachers in schools understand and use it. This study sought to fill this gap by using a case study of seven mathematics classes in six schools. Data was collected through interviews, observations and document analysis.

There were four main findings. First, some consistency was observed between cooperative learning instructional technique practices and concepts outlined in the National Curriculum Statement of 2012. Second, teachers used different varieties of teaching approaches to promote mastery of subject content. Third, cooperative learning as an instructional technique did not appear to be the dominant approach to teaching. Fourth, some teachers experienced challenges in setting up cooperative learning structures in the classroom; they confused cooperative learning with ordinary group work. The study concluded that the understanding and use of the cooperative learning instructional technique varied according to whether a teacher was oriented towards the *instruction paradigm* or the *learning paradigm* in their teaching. It is recommended that further research be carried out using a quasi-experimental method to investigate the effectiveness of this instructional technique on learner performance. Furthermore, teachers must receive pedagogical support in conceptualising and practising the cooperative learning instructional technique.

KEY WORDS: Cooperative learning; group work; learning paradigm; instruction paradigm; instructional technique.

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This study I dedicate it to all my children (what I was teaching them through their mothers), and to all my students as the blessed Paul once said, ‘The children ought not to lay up treasures for the parents, but the parents for the children’. Therefore, I say it is not only for the parents or teachers to do this great work for and on behalf of their children or students, but for the children or students to rise up and help not only each other but their parents or teachers to realise what is theirs.

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ACRONYMS

ACE	Advanced Certificate in Education
A/CES	Acting Chief Education Specialist
ANA	Annual National Assessment
B.Ed	Bachelor of Education
CAPS	Curriculum Assessment Policy Statement
ECDBE	Eastern Cape Department of Basic Education
ECDoE	Eastern Cape Department of Education
EMIS	Education Management Information System
EMS	Economic Management Sciences
GIS	Geographical Information System
HOD	Head of Department
LAN	Local Area Network
M.Ed	Master of Education
NCS	National Curriculum Statement
NEIMS	National Education Infrastructure Management System
NS&Tech	Natural Sciences & Technology
OBE	Outcomes Based Education
PIES	Positive Interdependence; Individual Accountability; Equal Participation; Simultaneous Interaction
UREC	University of Fort Hare Ethics Committee

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CHAPTER 1

INTRODUCTION OF THE STUDY

1. 0 BACKGROUND

In the last twenty one years, since the attainment of democracy in South Africa, there has been a move to democratise the curriculum in form and in content. With the advent of democracy in 1994, South Africa sought to move away from the teacher-centredness of instructional techniques and introduce learner-centred teaching techniques. In terms of the form, the structure of the curriculum was changed and geared towards achieving universal access. With regard to content, the teacher-centred instructional approaches were seen by many researchers (Mkhize, 1999; Skosana, 2009) as oppressive. The instructional paradigm was characterised by what Paulo Freire (2006) calls the teacher-centred *banking* concept of education where the teacher's task was to "fill" the learners with the contents of his or her narration. Within this paradigm, instead of communicating, the teacher issues communiqués and makes deposits which the learners would patiently receive, memorise, and repeat.

Learner-centredness was part of the new outcomes-based-education (OBE) where learning was essentially seen as an interactive process between and among teachers and learners, with the learners at the centre of the process and the teacher serving as a facilitator. OBE placed strong emphasis on cooperative learning (NCS, 2010:61-63). Learner-centred teaching approaches emphasise various forms of instructional techniques, one of which is cooperative learning. Cooperative learning as a teaching method has been practiced by teachers around the world for many years. Schul (2011:88) has argued that a re-visit to this approach of teaching revealed that it still holds great promise in this twenty-first century.

However, it has been observed that teachers often confuse cooperative learning with group work or collaborative learning and thus miss out on its essential principles and the benefits it can offer in the teaching and learning situation

(Johnson and Johnson, 2009, 2013 & 2014; Esmonde, 2009; Hsiung, 2012). In the NCS (2005:93 & 2010:61- 63) cooperative learning is a way of teaching in which learners work together to ensure that all members in their groups have learnt the same content. In the NCS (2012) cooperative learning is said to be an instructional use of small heterogeneous groups of learners (about five) who work together to maximise their own and each other's learning.

The NCS's aim of cooperative learning is to develop learners who can work cooperatively as members of a team, and to advance cooperative learning in order to realise socially sustainable development. The common goal and the vision of a socially sustainable society is constitutionally mandated and articulated in the South African Constitution, Act No. 108 of 1996, realising a socially sustainable society through cooperation. The value of cooperative learning in developing in learners sound social outcomes resonates with the tenets of socially sustainable development. In principle, this vision entails the promotion and advancement of democracy, equity, social justice and equality, non-sexism and non-racism, tolerance, respect, rule of law, accountability, transparency, and human dignity. Socially sustainable development makes cooperative learning valuable in realising the former (Teise, 2013:520-522).

1.1 COOPERATIVE LEARNING AS AN INSTRUCTIONAL TECHNIQUE: ISSUES AND DEBATES

There are two main sets of issues associated with cooperative learning techniques. The one relates to how to describe it. The other relates to its implementation.

1.1.1 Understanding cooperative learning

There is a great deal of contestation in the literature concerning how to describe cooperative learning. Some define it in terms of essential elements (Johnson and Johnson, 2009), others in terms of practices (Slavin, 2014). Kagan (2009) calls it

"the PIES and that's what sets cooperative learning apart from other approaches to instruction; the PIES principles are the lynchpin to successful cooperative learning." NCS (2005 & 2010) put forward an all-inclusive six essential characteristics of understanding cooperative learning as an instructional approach. The NCS (2012) defines it in terms of five essential elements.

Within the above understanding, one of the most fundamental features of cooperative learning common among its proponents is highlighted by Schul (2011:89) who stated that cooperative learning "includes individual and group efforts whereas typical group work focuses on the group efforts alone." Kagan (2009) declared that if one of the elements of cooperative learning is missing then the technique cannot be described as cooperative learning.

1.1.2 Benefits of cooperative learning: debates from research

Research on cooperative learning has yielded results that have generated a lot of debate. In the early 1990s cooperative learning (Van Tassel-Baska, Landrum and Peterson: 1992) research concluded that cooperative learning appears to be effective in teaching learners of average ability. Its value in teaching gifted children was questionable. In Pakistan Parveen, Mahmood and Arifz (2011) research concluded that cooperative learning was not found to be a better instructional strategy than a routine method of instruction. In Taiwan, Hsiung (2012), on the other hand, found that learners studying cooperatively exhibited significantly better academic achievement in mathematics both in the unit tests and homework than those in the individualistic learning conditions. A similar result was obtained in Malaysia where the research of Zakaria, Chin and Dauds (2010:272) showed that "cooperative learning methods improve learners' achievement in mathematics and attitude towards mathematics." Alebiosu's (2001) study in Nigeria affirmed the benefits of cooperative learning when she found that the strategy positively influenced learners' attitude towards chemistry.

In South Africa, curriculum documents (NCS, 2012) list improved learner achievement as one of the benefits of the cooperative learning instructional techniques. Despite the importance of this instructional method, not much

research has been conducted on the topic. Learners continue to underperform, especially in mathematics. Much of this failure is attributed to inappropriate teaching methods. The debates are further elaborated in chapter 2.

1.1.3 Teaching of mathematics: the need for a cooperative learning approach

Since mathematics is one of the subjects where learners perform poorly in South Africa, one of the expected changes is the improvement in mathematics learner achievement. Mathematics learning should change for better in accordance with NCS (2012) as it requires higher levels of understanding which is far more than mere memorisation of definitions, concepts, formulas and operations with the aim of applying these to maths problems and exercises which do not relate to real life. By moving into the abstract too soon may hinder the understanding of concepts (NCS, 2005:59 & 2010). In the NCS (2012) “the outcomes and assessment standards emphasise participatory, learner-centred and activity-based education. Learning outcomes prescribe content or method. “It should be noted that there are several methodologies, but only one methodology has been selected to illustrate how the different needs of learners could be catered for in one lesson, and that is co-operative learning” (NCS, 2005 & 2010).

Parveen (2010) carried out a study on how cooperative learning affects learner achievement and problem solving skills by comparing learners’ mathematics achievement and problem solving skills. The experimental section was instructed using cooperative learning methods and the control section was instructed using the traditional lecture methods. The cooperative instruction group showed significantly better results in mathematics achievement and problem solving skills. The researcher concluded that the utilisation of cooperative learning methods is a preferable alternative to the traditional instructional methods. The research cited above shows that the use of cooperative learning can have positive effects on learners’ attitudes towards a subject perceived to be difficult.

1.2 MOTIVATION FOR THE STUDY

Summative assessments such as the Annual National Assessments (ANA) inform the NCS of the strengths and weaknesses in learner achievement levels. In maths the results have indicated that learners in the selected schools are not performing according to the expectations in the NCS (2012). Since the summative assessment is used for promotion purposes, according to the promotion requirements of the NCS failing mathematics means a learner will have to repeat the grade. The teaching-learning approach and its implications of poor learner performance in mathematics has remained a matter of great concern to all stakeholders. For instance, the World Economic Forum (WEF) recently ranked South Africa 148th out of 148 countries on the quality of its maths (and science) education (Spaull, 2014). Poor teaching method is one of the major factors influencing poor achievement and retention, according to Gambari, Falde and Adegbenro (2014:128). These quotes suggest that something is wrong with the teachers' approach in teaching the subject content. It may be when teachers are in the classroom they are not concerned about the teaching approach but about producing knowledge. So the problem faced by the East London District is to get the schools that performed poorly (i.e. quintile 1,2, and 3) to be on par with the ones in quintile 4 and 5, that is, ex-model C schools which got the highest pass rates. Secondly, the aim is to get an oversight of what mathematics teaching-learning approaches are used most by teachers during maths lessons. Since not much research has been done regarding the cooperative learning approaches in the teacher and learning of mathematics, there is a need to investigate not only how teachers implement cooperative learning but what implications it has for learner performance. This is why this study looks at teachers' use of the cooperative learning instructional techniques in township schools in East London.

1.3 STATEMENT OF THE PROBLEM

Although cooperative learning has been used by teachers around the world with varying results, a growing body of research shows that it has demonstrable benefits in teaching and learning. South African high schools struggle with

underperforming learners in a number of areas. One of the subjects in South Africa where learners have experienced difficulties in achievement is mathematics (DBE, 2011). Among the teaching issues that affect the quality is how teachers deal with the delivery of subject matter content and how they deal with attitudes to the subject. Schul (2012) has argued that cooperative learning's peculiar instructional techniques aids teachers in teaching subject content and social skills and dispositions to learning.

In similar vein, Mkhize (1999) has pointed to a gap in addressing underperformance in mathematics which speaks to what cooperative learning seems to address. It is for this reason that this study seeks to contribute to the debate by focusing on mathematics teachers' practices of cooperative learning instructional techniques.

1.4 MAIN RESEARCH QUESTION

How consistent are mathematics teachers' cooperative learning practices in six schools as the concept is outlined in the NCS (2012)?

1.4.1 Sub-research questions

- What cooperative learning practices do mathematics teachers implement in six schools in the East London District?
- What practices do educators think promote mastery of subject content
- What promotes social skills and positive attitudes?
- What are the implications of the cooperative learning instructional techniques for performance in mathematics?

1.5 PURPOSE OF THE STUDY

The purpose of the study is to investigate mathematics teachers' practices of the cooperative instructional techniques.

1.6 SIGNIFICANCE OF THE STUDY

Although cooperative learning has been used around the world for many years, in South Africa it is relatively new. It is one of the techniques emphasised in the Mathematics NCS (2012) yet not much research has been done into how teachers understand and use it. Furthermore, research shows that cooperative learning has the potential to assist learners improve their performance. It is, therefore, important to establish how this approach is being used by teachers of one of the subjects where learners underperform.

1.7 DEFINITION OF TERMS

1.7.1 Cooperative learning - Cooperative learning is actually a generic term that refers to numerous methods for organising and conducting classroom instruction (Johnson, Johnson, and Stanne, 2000).

1.7.2 Performance and achievement - Learners' performance/achievement simply means the average of learners' scores on assessment standards (Jude, 2010). The two words will be used interchangeably in this research.

1.7.3 Cooperative learning principles - The essential elements which help learners to work together more effectively (Johnson and Johnson, 2009).

1.7.4 Cooperative learning practices – practices of cooperative learning principles to bring out the tremendous potential of this approach (Slavin, 2014).

1.8 LITERATURE REVIEW

The literature is divided into four main parts (cf: chapter 2). The first part covers the conceptual framework of cooperative learning, including the principles and practices of cooperative learning by Johnson and Johnson (2009, 2013 & 2014), Kagan (2009, 2014), Slavin (2014) in correspondence with the principles of cooperative learning as explained in the NCS (2012). This is followed by eight studies in the review of the research on the implementation of cooperative

learning globally and in NCS (2012). The third part presents theories and philosophies for understanding cooperative learning. The fourth part covers debate issues regarding group learning, opportunities to learn, and ecological systems.

1.9 RESEARCH METHODOLOGY

This is a case study of six schools in three circuits in the East London District of the Eastern Cape, South Africa. The purpose of choosing a case study is to identify patterns of meanings of data on cooperative learning instructional techniques practices and to find out if there are any implications for poor learner performance. This study is based in the interpretive paradigm. An interpretive research paradigm is one that is fundamentally concerned with meaning and it seeks to understand social members' definition of a situation. The two main methods of data collection were the interviews of maths teachers and observations of cooperative learning lessons. The other two methods used were document and archival record analysis, and field notes as summarised in the figure below.

Figure 1.1: Methods of data collection

Data source	Data on
Interview mathematics teachers	What do teachers think about cooperative learning as a teaching method? How do they practice cooperative learning techniques in teaching maths?
Observations of selected lessons	What types of cooperative learning are used? What kind of learner involvement is there in terms of cooperative learning principles as outlined by Johnson and Johnson (2009), NCS (2012)?
Document and archival record analysis	When is cooperative learning used? What are the implications of cooperative learning for learner performance?
Field Notes	What is transpiring in a given situation?

1.9.1 Research approach

The general approach this study has adopted is a qualitative approach. Qualitative research is all about exploring issues, understanding phenomena, and answering questions. It is used to inform business decisions, policy formation, communication and research (Ereaut, 2007) and I collected data through interviews, document analysis, field notes and writing memos. Interviews were audio recorded and important points were jotted down during interviews. It also

relies heavily on other naturalistic methods such as observations. The observation tool is a measurement device that use method of counting and totalling behaviour (cf: chapter 3).

1.9.2 Research design

This was a case study of mathematics teachers in six schools in the district of East London. Since one of the characteristics of the case study method is the type of research question: typically to answer questions like “how” or “why” (Yin, 2014), it was appropriate for me to adopt a case study research design. The reason this research focused on teachers was that the case study is directed to the method of teaching and not the content of learning. To establish trustworthiness in ‘qualitative’ inquiry Lincoln and Guba (1985) appeal to the criteria of (a) credibility, (b) transferability, (c) dependability and all these are enlarged upon in chapter 3.

1.10 ETHICAL CONSIDERATIONS

In order to conduct the study ethical clearance and permission to undertake the research was sought from the gatekeepers into the fieldwork by writing application letters to the Govan Mbeki Research and Development Centre (GMRDC) ethics committee and the Eastern Cape Department of Education (ECDoE). An Ethical Clearance Certificate (see Appendix 2) and permission to do the research (see Appendix 3) were both given in writing. After receiving the mandate to conduct research, ethical considerations such as informed consent (see Appendix 7) for voluntary participation, confidentiality and anonymity of participants and the schools were observed and followed. These are further explained in detail in chapter 3.

CHAPTER 2

THE LITERATURE REVIEW

2.0 INTRODUCTION

This chapter is divided into two main sections. The first section covers the conceptual framework. The conceptual framework itself is divided into four subsections. The first subsection covers Johnson and Johnson's (2009) five elements of cooperative learning, Kagan's (2009) four basic principles of cooperative learning and Slavin's (2014) five key practices of cooperative learning. The second subsection covers the NCS's subsection on cooperative learning. The third subsection reviews eight studies in cooperative learning locally and abroad (South Africa, Malaysia, Pakistan, Singapore, Taiwan, Hong Kong, Cortland (USA), and Nigeria). The fourth subsection is divided into three parts dealing with 'understanding theories and philosophies' behind the cooperative learning instructional approach. They are as follows: social constructivist theory, the philosophy of *ubuntu*, outcomes based education (OBE), and the African Renaissance. The second section is the theoretical framework which is divided into three subsections as follows: the debate issues of Strijbos and Martens' (2001) perspectives on group learning, Esmonde's (2009) four points for understanding opportunities to learn in cooperative learning, and the third consists of two ecological system studies. The first study reviewed is by Feinstein, Driving-Hawk and Baartman (2009) in America and the second study is by Gagné and Sparks (2013) in Canada. Lastly, the conclusion closes the chapter.

2.1 CONCEPTUAL FRAMEWORK

Recent and classic writings have been used. Slavin's work(2014) on practices is recent while Johnson and Johnson (2009; 2014) and Kagan's (2009; 2014) work go back years. The NCS (2012) Mathematics Teachers' Resource Pack on the

cooperative learning approaches is also discussed. Therefore, this section will be divided into two main parts. The first part will draw on Johnson and Johnson's (2009:366-370), Johnson and Johnson (2013) and Johnson and Johnson (2014:1-3) five principles of cooperative learning; Kagan's (2009 & 2014) four basic principles of cooperative learning; and Slavin's (2014) five key practices of cooperative learning. The second part focuses on the NCS (2012) cooperative learning. The reasons for doing this are that this section needs to be 'beefed up' as it states the key conceptual ideas which are central to cooperative learning techniques. As an instructional technique it also provides a supportive social learning environment which is much needed since a problem-solving endeavour can be extremely frustrating and emotionally draining.

2.1.1 Johnson and Johnson's five essential elements of cooperation as an instructional technique

Johnson and Johnson in Koh, Tan, Wang, Ee and Liu (2007) defined cooperation as "working together to accomplish shared goals", and further as "the use of small groups so that individuals work together to maximise their own and each other's productivity and achievement". According to Johnson and Johnson (2009:366) there are five essential elements of cooperation: *positive interdependence; individual accountability and personal responsibility; promotive interaction; the appropriate use of social skills; and group processing.* According to Johnson and Johnson (2009) social interdependence theory provides a foundation on which cooperative learning is built and these five essential elements are based on the origins of Morton Deutsch's (1979) social interdependence theory studies of conflict as opposed to cooperation. In other words according to my own understanding of Johnson and Johnson this means that learners put in a group must show that they are socially interdependent and that they cooperate in learning. These five essential elements are explained below.

2.1.1.1 *Positive interdependence*

The first essential element is positive interdependence. According to Johnson and Johnson (2009:366) the impact of positive interdependence on productivity and achievement means that individuals achieved higher with positive goal interdependence than when they work individually. They need to work together as a team, by volunteering in helping, supporting or assisting anywhere where there is a need to do so. Related to social interdependence in my understanding is that there is no hierarchy: every learner is equal. Johnson and Johnson also pointed out that positive interdependence is posited to result in individual accountability and promotive interaction (i.e. learners encouraging and facilitating each other's efforts to complete tasks in order to reach the group's goals), explained below.

2.1.1.2 *Individual accountability and personal responsibility*

The second essential element is individual accountability and personal responsibility. According to Johnson and Johnson (2009:368) individual accountability exists when the performance of each individual learner is frequently assessed and the results are given back to the individual and the group to compare against a standard of performance. They argued that group members should know that they cannot "hitchhike" on the work of others. They also warned against large groups, that is, the bigger the number of members in the group, the lesser one will participate, and the smaller the size of the group the more there is individual accountability. Otherwise, loafing increases as the size of the group increases. In my understanding related to social interdependence this principle requires control and management skills and division of tasks from the teacher's side to avoid conflict in order for there to be smooth, active cooperation and progress.

2.1.1.3 *Promotive interaction*

The third essential element of cooperation is promotive interaction. According to Johnson and Johnson (2009:368) promotive interaction occurs as learners encourage and facilitate each other's efforts to accomplish the group's goals. "Learners promote each other's learning by helping, sharing, and encouraging efforts to learn," (ibid). That is, during groups' interactions learners explain, discuss, and teach one another. Related to social interdependence this principle, in my understanding, can be observed when learners are sitting in *small* groups (forming 'round-tables' by putting desks together) talking face-to-face to each other, exchanging opinions and writings.

2.1.1.4 *Appropriate use of social skills*

The fourth essential element of cooperation is the appropriate use of social skills. Johnson and Johnson (2009:369) argued that group members cannot cooperate effectively if they do not have the necessary skills like interpersonal and small group skills. Effective cooperation is based on skilled members as well as on task behaviour. In my understanding relating to social interdependence this means that teachers must teach learners the needed social skills as academic skills, for example, communication skills, leadership skills and problem-solving skills in order to have effective cooperation. Mastering of these skills promotes higher achievement, and it also builds positive and effective working relationships among group members (ibid).

2.1.1.5 *Group processing*

The fifth essential element of cooperation is called group processing. According to Johnson and Johnson (2009:369 & 2013) the groups need a free-time specifically to discuss how well they are achieving and how well they are keeping an effective working relationship among members. They argued that by reflecting on the "actions of group members that enhance or hinder the group's success

may reduce loafing" by highlighting the strengths and weaknesses of each of the group members. They further argued that the teacher may require learners to list member actions that helped the group to be successful and those that could be added to make the group even more successful (ibid). In my understanding this is the method of assessment when learners assess their own performance standards whether they have mastered certain skills or not.

2.1.2 Kagan's four basic principles of cooperative learning instructional techniques

According to Kagan (2009 & 2014) there are four basic principles of cooperative learning. The Kagan model, known as PIES, puts emphasis on four basic principles of cooperative learning: *positive interdependence; individual accountability; equal participation; and simultaneous interaction*. These four basic principles are presented below.

2.1.2.1 *Positive interdependence*

The first basic principle of cooperative learning is positive interdependence. According to Kagan (2009 & 2014) learners are positively interdependent when a gain for one is a gain for another and they all feel that they are on the same side. Learners are negatively interdependent when a gain for one learner can be obtained only by a loss for another, in which case they feel to be in competition. Kagan argued that when a teacher asks a question, many learners raise their hands. If the selected learner hesitates or begins to miss the question, the other learners wave their hands with glee. The loss of their classmate is a gain for them. A gain for one is loss for another. Negative interdependence undermines the desired social outcomes such as sharing, caring, helping, and empathy.

2.1.2.2 *Individual accountability*

The second basic principle of cooperative learning is individual accountability. According to Kagan (2009 & 2014) when teachers call on volunteers, like “can anyone tell me...?” or “I need a volunteer to share...”, any learner can avoid being called by simply not raising his or her hand and thus violating the principle of individual accountability. In my understanding this means that because there is no individual accountability required, learners just do not want to be engaged hence they will show an off-task behaviour.

2.1.2.3 *Equal participation*

The third basic principle of cooperative learning is the equality participation. According to Kagan (2009 & 2014) the equality principle asks a powerful question: How equal is the participation among the learners? Kagan argued that in a transmission method the equality principle is violated because the same subgroup of highly motivated learners will always have their hands up while another subgroup of less motivated learners will not do that. Thus teams of four or two maximise and equalise active participation compared to any other group size, otherwise participation becomes very unequal.

2.1.2.4 *Simultaneous interaction*

The fourth basic principle of cooperative learning is simultaneous interaction. The simultaneity principle, according to Kagan (2009 & 2014), asks a simple but powerful question: What percent of our learners are overtly active at any one moment? Or, to phrase it another way, how much simultaneous interaction is there? Kagan argued that it is better to have a quarter of the class overtly active than just one learner! In my understanding this principle, according to Kagan, does not tell us only why cooperative learning is much more powerful than the transmission mode of teaching, but it also tells us why teams of four are the best. He further argued that instead of having one learner to answer, by discussing the question in teams of four, in the same time-frame, at least one of every four

learners is actively engaged articulating their thoughts. This increased active participation in cooperative learning is partially responsible for the gains shown among learners in cooperative learning.

2.1.3 NCS's (2012) five essential elements of cooperative learning

In the NCS (2012) Mathematics Teachers' Resource Pack there are five essential elements of cooperative learning principles: *positive interdependence; individual accountability; social skills; face-to-face interaction;* and *group processing.* There are 17 given instructional techniques which can be used in the Intersen (Intermediate and Senior) Phase classroom. "While there are several methodologies, one methodology has been selected to illustrate how the different needs of learners could be catered for in one lesson, and that is cooperative learning" (NCS, 2010:58). Therefore, in this subsection, cooperative learning is defined as an instructional use of small heterogeneous groups of learners (about five) who work together to maximise their own and each other's learning. The relationship of principles and practices are analysed. Its policy perspective is presented below.

2.1.3.1 *Positive interdependence*

The first essential element of effective cooperative learning is positive interdependence. According to the NCS (2012), policy document, positive interdependence is the understanding that the success of a cooperative group depends on the positive contribution of all learners in a group. In practice, group members are complementing and NOT competing against one another. This corresponds with Johnson and Johnson's (2009 & 2014) positive interdependence above.

2.1.3.2 *Individual accountability*

The second essential element of effective cooperative learning is individual accountability. In this principle, the NCS (2012) explains that while working as members of cooperative groups learners are held individually accountable to perform their share of work. In practice, this means that ALL group members must contribute towards the completion of the task; and that also means carefully dividing the task among group members so that they take turns to present or report in their groups.

2.1.3.3 *Social skills*

The third essential element of the cooperative learning instructional technique is interpersonal and social skills such as listening to others, decision-making and communication (NCS, 2012). In practice, the characteristic of this principle means that in order to achieve this, learners should be encouraged to value other learners' contributions, listen to each other, and NOT to outsmart each other (DBE, 2010:64). That also means learners must study these interpersonal and social skills as academic skills, for example, through interdependence roles.

2.1.3.4 *Face-to-face interaction*

The essential element of effective cooperative learning activities is face-to-face interaction. According to the NCS (2012) policy, in face-to-face interaction learners promote, support and encourage each other's efforts to achieve group goals. It is further stated in the NCS (2010:63) that in practice interaction must take place among learners, NOT between learners and learning materials. This practice in the NCS (2012) policy includes that the teacher must explain how to solve mathematics problems, and discuss and explain the nature of mathematics concepts to be learned, etc. To learners, in practice, for instance, it also means they must sit face-to-face at round-tables and NOT raise their voices when communicating with each other during cooperation.

2.1.3.5 *Group processing*

The fifth essential element of effective cooperative learning is group processing. In practice, the principle of group processing, according to the NCS (2012), is an exercise in which learners reflect and evaluate the process of cooperative group work. This means that group processing occurs when ALL members of a group discuss how well they are working, what group decisions are helpful and what adaptations are needed to maximise group efficiency. In practice, it also means that learners look at their strengths and weaknesses in terms of successes and failures.

In summing up, these five NCS (2012) principles in relationship to practice showed what emphasis the South African policy document gives in terms of the policy and practice of cooperative learning techniques. While these principles inform and safeguard the practice of cooperative learning, Slavin (2014) argued that there is a practice gap, meaning that most teachers do not use cooperative learning regularly, despite the extensive research supporting it.

2.1.4 Slavin's five key practices of cooperative learning as an instructional technique

According to Slavin (2014:22) there are five key practices that make cooperative learning powerful: *form interdependent teams; set group goals; ensure individual accountability; teach communication and problem-solving skills;* and *integrate cooperative learning with other structures.* These five key practices are presented below.

2.1.4.1 *Form interdependent teams*

The first key practice is to form interdependent teams. According to Slavin (2014:23) an interdependent team is a group composed of diverse members who

care about helping one another to learn with all members knowing that they depend on one another for help. They even move their desks together to form a round-table and choose, for example, a team name, creating a motto or an emblem to express their group's personality. Related to social interdependence is the moving of desks together. In my understanding a face-to-face seating arrangement is a necessary element for cooperation to actively and smoothly take place.

2.1.4.2 *Set group goals*

The second key practice is to set group goals. According to Slavin (2014:23) a group goal is a target, product, or indicator, e.g. a team goal could be increasing the average score on a quiz that all learners take individually after they have helped one another. In each case, a teacher both looks at the team average and evaluates the individual product. My understanding of this second key practice by Slavin is that when there is a reward to achieve, for example a first class pass as a set goal, learners tend to do their utmost best. Related to social interdependence this can be observed during activity when learners pool together their individual efforts.

2.1.4.3 *Ensure individual accountability*

The third key practice is to ensure individual accountability. According to Slavin (2014:24) individual accountability means that to reach the team goal all group members must master the targeted content or skills. To understand why this is important, according to Slavin, *without* individual accountability there will be just mere group work, which will likely produce two undesirable outcomes: the *free rider* and the *know-it-all.* In my own understanding of Slavin if this third key practice is missing, there is no cooperation. In addition to the two undesirable outcomes, you will end up with noisy, off-task behaviour and/or bullying. This is one of the reasons some teachers dislike using this approach. Related to social interdependence this key practice is about creating maximum participation and maximum participation is maximum cooperation.

2.1.4.4 *Teach communication and problem-solving skills*

The fourth key practice is to teach communication and problem-solving skills. According to Slavin (2014:25) this means that group members need to know beforehand the key interpersonal skills, like *active listening, explaining ideas and opinions, encouraging teammates,* and *completing tasks*. My understanding of this practice is that it stresses the democratic values of tolerance, expression, and respect towards each other. As skills they are necessary and can be observed during an activity. Related to social interdependence these can be observed when learners work cooperatively by taking turns and opportunities to speak and solve problems.

2.1.4.5 *Integrate cooperative learning with other structures*

The fifth key practice is to integrate cooperative learning with other structures. According to Slavin (2014:15) cooperative learning should be seen as a key part of each lesson. He pointed out that effective class lessons might also include teacher instruction by arguing that at some point a teacher needs to explain the essential objectives and give learners parameters and guidance for their group work so that they can move forward. My understanding of Slavin on this key practice is that teachers must not take the back seat and vanish during the lesson. Instead they sit in a position where they can see how all the groups are working or they must move around the groups, be on the lookout and facilitate and coordinate all groups and remove deadlocks. Social interdependence does not happen only among learners; it also happens between learners and the educators.

In rounding off this section, the success of cooperative learning largely rests on the relationship among practice, research and theory. Johnson and Johnson (2009) declared that the theory of social interdependence forms the foundation of cooperative learning. Kagan (2009) argued that if one of the principles is missing, such a practice cannot be called cooperative learning. Candler (2013) said that in her practice as she worked with Kagan's structures she began to

apply the principles of accountability and equal participation to her own instructional practices to ensure that each cooperative task was a learning opportunity for all. Common to the NCS (2010:58), Johnson, Johnson (2009) and Kagan (2009) there is a widespread use of cooperative learning which results from the variety of cooperative learning methods available for teacher use, ranging from very concrete and prescribed ones to very conceptual and flexible methods, since cooperative learning is just a generic term.

2.2 STUDIES IN COOPERATIVE LEARNING INSTRUCTIONAL TECHNIQUES

Eight studies in several countries have been reviewed that support the practice of cooperative learning. Since it is impossible in this section to summarise the vast literature on cooperative learning, this study only focuses on selected studies that support the practice of this teaching method. These studies are presented below.

2.2.1 A study conducted in Malaysia

In Malaysia a quasi-experiment study was conducted whose purpose was to discuss the shortcomings in science and mathematics instructional practices. The first idea behind this study was that cooperative learning is grounded in the belief that learning is cooperative and increased when learners are actively involved in sharing ideas and work cooperatively to complete academic tasks. Two, cooperative learning created many learning opportunities that do not typically occur in the teacher- centred paradigm (Zakaria and Iksan, 2007:37). In order to achieve the purpose of this study, a quasi-experiment was conducted. One group was taught using the teacher- centred approach and the other group was taught using the cooperative method. The findings showed that cooperative group instruction showed significantly better results in mathematics achievement and problem solving skills (ibid). Further, other researchers have reported similar findings that point to the achievement benefits of using cooperative learning (Faizah, 1999; Yee, 1995; ibid).

2.2.2 A study conducted in Pakistan

In Parkistan a (quasi-experiment) study was designed to explore the effect of cooperative learning on academic achievement in the subject of social studies (Parveen, Mahmood, Mahmood, and Arif, 2011:950). The idea behind this study was that cooperative learning is more effective as a teaching technique for mathematics as compared to the teacher-centred instructional technique. The study design consisted of two groups, namely the teacher-centred instructional techniques group and the cooperative instruction group. It was concluded that the two groups did not differ in their academic performance. The final conclusion that may be derived from this study is that the cooperative learning model was found to be not more effective for teaching social studies than the instructional approach of teaching. In Pakistan there was found to be a gap in research literature on teachers' practices of cooperative learning. Parveen et al. (2011) argued that, though the cooperative learning model is attracting worldwide attention of researchers, very few studies could be found relating to this instructional technique in Pakistan.

2.2.3 A study conducted in Singapore

In Singapore a case study was undertaken to investigate perceptions of learners with low ability on the effectiveness of a group project, a form of cooperative learning. The assumptions were that: (a) cooperative learning, and thus project work, provides the opportunity for learners to develop their social and communication skills, (b) group project work fosters cognitive development by promoting interaction amongst learners. The reasoning was that in the educational context of Singapore there was an emphasis to cater more effectively for the needs of learners with low ability (Koh, Tan, Wang, Ee and Liu, 2007:96). Findings showed that "although the learners recognised that the cooperative learning group improved their competence in interacting with others," i.e. by promoting their social and cognitive skills, the effectiveness amongst the low ability groups was hampered by organisational and instructional issues that

have to be ironed out in order for the learners to benefit fully from cooperative learning programmes (ibid).

2.2.4 A study conducted in Taiwan

A study was conducted in southern Taiwan (Hsiung, 2012:125&130-132). The purpose of the study was to compare cooperative learning versus individualistic learning. The results showed that learners in the cooperative learning context performed substantially better in both the homework and unit tests than those in the individualistic learning context. Further Hsiung discussed that it does not necessarily guarantee that learners who work in cooperative learning groups will out-perform those who work alone. It is only possible in a mature cooperative group and a mature group that has all of Johnson and Johnson's five essential elements of cooperative learning. According to Johnson and Johnson (2009) "If one of the five elements of cooperative learning is missing, then the technique cannot be described as cooperative learning" (ibid).

2.2.5 A study conducted in Hong Kong

A quasi-experiment study was conducted in Hong Kong on the effects of cooperative learning on enhancing fifth graders' achievement goals, autonomous motivation and reading proficiency by Law (2010:408). The main idea that came out of this study was that cooperative learning activities that emphasise learners' responsibility tend to encourage learners' efforts towards group performance and promote learners' autonomous motivation in the classroom. A cooperative learning activity, a jigsaw, was given to the experiment group, and drama activity for the teacher led approach was given to the control group. Findings indicated that cooperative learning with the teacher guided instruction was more effective in helping young children to learn than cooperative learning with minimal guidance (refer this finding to Slavin's fifth key practice). The second finding indicated that learners in the jigsaw group outperformed learners in both the drama and in the reading comprehension test group.

2.2.6 A study conducted in Cortland (U.S.A.)

An action research was conducted in Cortland on fifth grade learners' on-task and off-task behaviours. The purpose was to examine the benefits of using cooperative learning instructional techniques in a fifth grade classroom with a high proportion of learners with learning disabilities (Cempa, 2008:2). The idea that came out of the study was that Gillies and Ashman (2000) suggested that peer learners are frequently more aware of what other learners do and do not understand, and clarify the material in ways that make sense to other children. Ten studies were reviewed and analysed according to their findings. The findings were sorted into the following four themes: peer interaction, increased cognitive function, enhanced academic performance, and greater social acceptance (ibid). The key findings were that learners clearly seemed to be on-task during cooperative learning to a greater extent than in regular lecture settings. Another finding was that prior to all experiences of cooperative learning, learners were frequently observed to be impatient and impolite. If a learner was reading and didn't know a word or made an error, other learners would laugh or impatiently give the answer instead of allowing the struggling learner time to think. After cooperative learning, learners frequently addressed each other in a kind and helpful fashion.

2.2.7 A study conducted in Nigeria

A study was conducted in Nigeria by Jebson (2011:107). The study, a quasi-experiment research design, was used to investigate the impact of a cooperative learning instructional technique on senior secondary school learners' performance in mathematics. The experimental group was taught using the cooperative learning instructional techniques while the control group was taught using the teacher guided techniques. The research generally revealed that the experimental group performed better than the control group (ibid.). The main idea that comes out of this study is that cooperative learning is a powerful technique with lots of benefits. Like in the case of the study above conducted in

Cortland, cooperative learning as an all-inclusive teaching method as was shown by these results in Nigeria that sex or gender differences had no significant influence on the performance of learners like the learners in Cortland, and disability as well had no significance in the fifth grade classroom.

2.2.8 Studies conducted in South Africa

In a study conducted in South Africa by Messerschimidt (2003:108 &111) one of the findings was that the success of the co-operative learning was dependent on one condition, a common language that learners could understand and express themselves. Sesotho, the home language of the majority of the learners in the schools, was used for meaning-making even though the official medium of instruction chosen by the parents and governing bodies of the schools then was English. According to Slavin (1990:95) in Messerschimidt (2003:107), researchers agreed that co-operative learning can produce positive effects on achievement but disagreed on the conditions under which the technique is effective. It seems according to the findings that it is unlikely that learners would have performed effectively in an English medium as they did in a first additional language context.

In another study, findings in classroom observations and interviews (Mkhize, 1999) revealed that both school and college educators use cooperative group work in a very limited manner for mathematics teaching. School learners' experiences of cooperative group work revealed by their responses on the questionnaire were very close to what is expected from teaching mathematics in a cooperative group work environment.

In rounding off these studies, where cooperative learning has been practiced without the support of research findings, it proved to be no better than other instructional techniques. The reason may be is that there is not enough research to support its practice or learners being exposed for a short time to this instructional technique or the reasons are organisational issues which are not in favour of this technique. But where both cooperative learning and teacher guided

instruction were practiced, learning increases especially when learners use a language they understand and express themselves in.

2.3 THEORETICAL FRAMEWORK

The theoretical framework will be divided into three sections. The first section will cover the debate discussions by Strijbos and Martens (2001) on theoretical perspective as an insight into cooperative learning, that is, the relationship between group work and Bronfenbrenner's social systems. The second section will draw on Esmonde's (2009) elements of a social systems' framework for understanding opportunities to learn in cooperative groups. The third part will give a deeper understanding of cooperative learning which will be attained by drawing on insights from theoretical frameworks and research informing them.

2.3.1 Theoretical perspective towards cooperative learning and group work

According to Strijbos and Martens' (2001) theoretical perspectives, there are differences and similarities between cooperative learning and group work called 'collaborative learning'. The notion of a group as a specific learning environment or rather as a microsystem is discussed through the lens of Bronfenbrenner's social systems theory below.

2.3.1.1 *Cooperative learning and group work*

According to Strijbos and Martens (2001) cooperative and group work should be regarded *as approaches to group based learning* and characterising them as 'techniques' indicates that a difference does exist. And again, a 'group' should be treated as a 'learning environment', a distinctive 'learning environment' with specific characteristics that affect group interaction. A common basis for cooperative learning and group work is an agreement upon five principles of group based learning. First, groups are composed of either a minimum of two up to six participants. Second, group based learning is characterised by 'positive

interdependence'. A third principle is the 'group task'. A fourth principle is 'individual accountability'. The final principle is a shift in the role of the teacher.

According to Strijbos and Martens (2001), two principles, both were introduced in the early 1980s, stand out among these five, 'individual accountability' (Slavin, 1980) and positive interdependence (Johnson, 1981). Slavin introduced individual accountability to counter possible off-task behaviours, also known as the 'free-rider effect' of group based learning. The 'free-rider effect' is a synonym for what is known in group dynamics as 'diffusion of responsibility'. Johnson introduced positive interdependence to heighten a sense of 'belonging', to enhance interaction, and to promote cohesion in a group.

The differences between the two techniques are based on the characteristics of the knowledge domain (Slavin, 1997; ibid). Cooperative learning is associated with well-structured domains whereas group work is associated with ill-structured domains. Cooperative learning is associated with division of labour, whereas in group work each member contributes not equally in the problem solving. Cooperative learning is associated with artificial interaction (as a result of provided structure) while group work is associated with a 'natural interaction' process.

2.3.1.2 *Bronfenbrenner's social systems and group work*

Bronfenbrenner identified five social systems types (Strijbos and Martens, 2001). The five social systems: microsystem, mesosystem, exosystem, macrosystem, and chronosystem, are given as follow:

The microsystem is the first layer. It consists of the interpersonal interactions in an individual's life. Examples include family, friends, school, and work. Following the microsystem is the mesosystem. Examples include the relationship between the parent and teacher. The mesosystem system has indirect implications for learners' academic performances. Following is the exosystem. In this system indirect forces include such factors as a parent's workplace, the school board, or the extended family. The learner does not interact directly with the entities in the exosystem but is impacted by relationships and decisions made in the

exosystem. Following the exosystem is the macrosystem. It is composed of the cultural values, customs, and societal laws of the individual's community. Finally, the chronosystem includes a broad picture of the individual's life within a socio-historical perspective. For instance, high divorce rates, or a parent's death would be examined to see their effect on the adolescent (ibid).

According to Strijbos and Martens (2001), related to Bronfenbrenner's first layer of the social system there is also a notion of a group as a specific learning environment or rather as a microsystem. The microsystem most closely represents small group interaction processes during group-based learning ('face-to-face' or 'distributed' and often 'on-line'). The product of the intellectual partnership that results from the distribution of cognitions across individuals or between individuals and cultural artifacts is a joint one; it cannot be attributed solely to one person. In other words Strijbos and Martens' (2001) concept of cultural artifacts refers to learning resources or materials. Cognition is regarded as "a life process, not mechanism, dynamic not static, a suite of functions and process, not a hierarchical system. Through interactions between actors in each of these systems not only affect the actors in the present system but may also indirectly affect other behaviours in other systems. That is interaction on meso, exo, macro and chrono levels affect an individual's actual behaviour and future potential behaviour (ibid).

2.3.2 Esmonde's learning opportunities and Bronfenbrenner's social systems

Esmonde's (2009:1011) framework for understanding opportunities to learn in cooperative groups focused on four points – namely, learning happens (a) through participation, (b) in relation to social ecology, (c) through processes of identity development, and (d) through communicating about mathematical content. Esmonde expanded on Bronfenbrenner's (1979:13) social systems. It is relevant to know how Bronfenbrenner's ideas relate to cooperative learning. Bronfenbrenner's ecological approach considers the development of an individual in relation to the "immediate environment, and the way in which this relation is mediated by forces emanating from more remote regions in the larger physical and social milieu" (ibid).

Bronfenbrenner's theoretical framework proceeds from the studies of Lev Vygotsky who argued that children learn through interactions with their surrounding culture. In other words, children learn from interactions with adults and peers in meaningful activities. He stated that through cooperative learning children can support each other, exchange ideas and think aloud (Esmonde, 2009). Translating this into a South African situation, teaching and learning can be expected to change for the better. Learners receive help that enables them to complete tasks that they cannot complete independently. These focusing points are given below.

2.3.2.1 *Learning and participation*

The first focusing point to understanding opportunities to learn in cooperative groups is that 'learning happens through participation'. According to Esmonde (2009:1011) learning can be defined as a change in participation in a set of collective practices. This change comes about through adaption or adoption of a community's way of speaking, acting, and interacting – although the community practices also change. Although one may be a peripheral participant at first – that is, observing practices without central participation or having others heavily support one's competent participation – the goal is for learners to adopt central participation without the teacher's direct help.

2.3.2.2 *Social ecologies of learning*

The second focusing point to understanding opportunities to learn in cooperative groups is that learning happens in relation to a social ecology. According to Esmonde (2009:1011) following in the footsteps of Bronfenbrenner (1979) and Erickson (2004), no learning is decontextualised. To understand a learning context, one needs to know the kinds of cultural forms available, the histories of practice, the immediate local context, the more distal societal structures – and consider how at any given moment all are acting in relation to one another.

Esmonde (2009:1012) further argued that classroom activities, including mathematical talk, do more than just convey mathematical ideas. Every moment of classroom interaction is also a part of constructing, challenging, and reifying learners' social positions and identities – some of which are constructed primarily in the classroom, some of which are related to the broader communities in which learners participate. In my understanding the roles assigned to learners mentioned here are, during cooperative learning groupwork, just the microcosm of daily society life. Learners who are coming from different social backgrounds bring their diversity into the classroom for exchange of ideas. Each one, teach one. However, the teacher must not belittle what is going on during groupwork; she or he has to know how learners relate to one another, because it is how culture, history and different structural contexts influence how learners act in relation to one another.

2.3.2.3 *Identity development and learning*

The third focusing point to understanding opportunities to learn in cooperative groups is that learning happens through processes of identity development. According to Esmonde (2009:1012) one's identity changes within the context of a practice as one becomes adept to that practice (or as others become adept). She argued that, whereas the term *identity* may carry the connotation of an enduring, static, essentialised self, identity may shift in meaning and salience as one moves from one context to the next. But this does not mean that individuals have perfect freedom to construct their identities or subject positions in a way they choose. Collective practices, including group work within a mathematics classroom, make subject positions available to learners.

2.3.2.4 *Communication and learning*

The fourth focusing point to understanding opportunities to learn in cooperative groups is that learning happens through communicating about mathematical content. According to Esmonde (2009:1013) one must consider the nature of the content-related talk, writing, gestures, and so on. Mathematical communication

should allow learners to make sense of one another's mathematical ideas in ways that help them participate in discourse practices, such as reasoning, argumentation, conjecture, and proof. As learners make efforts to communicate about and solve emergent problems in collective practices, there must be a mutual bridging of ideas rather than a simple transmission from one person to another. There has to be an intersubjectivity, a state in which two or more people have a shared meaning for a situation and know that they share that meaning. Intersubjectivity is a concern in terms of cooperative learning in mathematics because learners' explanations play a central role in group work. If learners focus on their own mathematical explanations rather than the hearers' understanding, they may be hampering the cooperative learning processes.

2.3.3 Ecological systems study and cooperative learning

This second part of the theoretical framework will give a deeper understanding of cooperative learning which will be attained by drawing on insights from theoretical frameworks and research informed by them. It will draw on 'Bronfenbrenner's theoretical frameworks' by Feinstein et al. (2009) in fostering resiliency, and Gagné and Parks (2013) on the 'role of scaffolding.'

2.3.3.1 *A study conducted in America*

A combined qualitative/quantitative study by Feinstein, Driving-Hawk and Baartman (2009:12) was purposed to examine resiliency factors in Native American teenagers using the structure of Bronfenbrenner's Ecological Systems Theory. The term 'resiliency' is used to describe the "human capacity and ability to face, overcome, be strengthened by, and even be transformed by experiences of adversity" (ibid). According to Bronfenbrenner, it is optimal when all systems are supportive of the individual, but it is not a prerequisite of resiliency. The focus was on strengths, not weaknesses found in at risk populations. According to the 'Circle of Courage' and Bronfenbrenner's ecological systems theory, this study substantiates the existence of individual and environmental factors of resiliency. Viewing the Circle of Courage through the lens of Urie Bronfenbrenner's

Ecological Systems Theory, an approach to human development, offered a framework for understanding teenage resiliency. Fundamental needs including belonging, mastery, independence, and generosity are laid out in a model known as the Circle of Courage as follows: A sense of belonging is established when learners form relationships within family, school, and community. Independence is developed as learners turn from irresponsible behaviour to responsible behaviour. Mastery is cultivated in experiences that facilitate success and knowledge. Key components in promoting a sense of mastery are active learning, cooperative learning groups, and stress-free, fun surroundings. Bronfenbrenner's theory allows for a close examination of human development through the division of five environmental subsystems. Answers were coded according to Bronfenbrenner's subsystems. Direct and indirect influences on the subsystems were defined and examined as follows:

2.3.3.1.1 *Microsystem*

According to Feinstein et al. (2009) sample questions like: *What are your plans following high school? Do you have a role model? Who? Why?* were asked. The findings were that the majority of learners surveyed had plans for their future. Only 6% of learners had no future plans. All of the learners interviewed had plans for college, with one boy planning to attend Harvard – a realistic goal for him. Most of the surveyed and interviewed chose a role model from either their nuclear or extended family. The following responses give insight into the positive qualities these learners identified in their role models: "she is there for me, helps/guides me through situations," "they'll always be there for me," "no matter how hard life may get, he always smiles and laughs," and "he's a hard worker". The positive relationships learners had with significant members of their family could be seen in responses to solving a problem at home.

All of the learners interviewed chose the same teacher as a role model. He was viewed as someone who supported their academic growth as well as their social/emotional need to belong. This attitude can be seen in the learners' descriptors of the teacher: "laid back", "he respects us and so we respect him", "he makes sure we understand", "relates to us" and "cares about us" (ibid).

2.3.3.1.2 *Mesosystem*

According to Feinstein et al. (2009:16) sample questions like: *What are your parents' attitudes toward school? Are they involved in your school? What are your friends' attitudes toward school?* were asked. The findings came out that sixty-two percent (62%) of the learners believed that their parents or guardians and teachers had a good relationship. The resilient learners' parents or guardians participated at the school; this was evidenced by their presence at parent/teacher conferences. Both the learners surveyed and those interviewed believed their friends did not value school as much as they did. The relationship between friends and teachers was seen as weak.

For instance, in South African schools there are other systems in place like parent and teacher components that are expected to work together to improve not only learners' academic performances but the whole school. If they don't come together this impacts the learners' morale in learning and in life in general.

2.3.3.1.3 *Exosystem*

According to Feinstein et al. (2009:17) the exosystem dealt with factors that indirectly impacted the adolescent. Sample questions like: *Describe your relationship with your extended family* were asked. The findings showed that the extended family played an unusually important role in the Native American adolescents' lives. Many learners chose a member of their extended family as their role model and during the interviews spoke of getting together on a regular basis. Numerous learners had an adopted grandmother in town or ate meals regularly with cousins. These individuals offered support and guidance to these adolescents.

2.3.3.1.4 *Macrosystem*

According to Feinstein et al. (2009:16) sample questions like: *Describe your community* were asked. The findings were that learners who were interviewed believed laws were constantly being broken in their community, especially laws pertaining to drinking and curfew. As one learner expressed, “Laws are not really enforced.” Even so, learners felt safe in town.

2.3.3.1.5 *Chronosystem*

According to Feinstein et al. (2009:17) sample questions like: *How does the majority white culture impact the Native American culture?* were asked. The findings came out that many of the learners spoke of being the victim of discrimination when travelling across country lines. Others had almost a feeling of acceptance, voicing the opinion that they were born into this.

2.3.3.2 *A study conducted in Canada*

Drawing on sociocultural theory Gagné and Parks (2013:195&203) conducted a study on the ‘role of scaffolding’ in cooperative learning tasks in a Grade 6 intensive ESL (English as a second language) class. According to Gagné and Parks (2013) a number of studies demonstrated that adults and high school learners are capable of providing each other with scaffolding while carrying out tasks in pairs and group work. For the purpose of this study three different types (i.e. Numbered Heads Together, Jigsaw, and Round-robin/Round-table) of cooperative learning tasks that incorporated the principles of positive interdependency and individual accountability (Johnson and Johnson, 2009) were used. Positive interdependence refers to tasks that ensure that all team members are required to work together to achieve a common goal. Individual accountability ensures that all team members are held accountable for contributing to the completion of a task through assigned parts and/or as part of an individual evaluation. The analysis of data revealed that during the carrying

out of the cooperative learning tasks, a total of 217 scaffolding strategies were invoked. The analysis also revealed that 73% of instance involving scaffolding were successful (Gagné and Parks, 2013:192&195).

2.4 UNDERSTANDING THEORIES AND PHILOSOPHIES UNDERPINNING COOPERATIVE LEARNING IN SOUTH AFRICAN POLICY DOCUMENTS

In a South African schooling environment it seems that it is important to understand not only how to apply the techniques of cooperative learning effectively, but also to know *how* they relate to the following four elements: social constructivist learning theory, *ubuntu,* OBE, and the African Renaissance (Bitzer,2001:98). These four elements underpinning cooperative learning will be discussed below.

2.4.1 Social constructivist learning theory related to cooperative learning

The first element that is related to cooperative learning in the national curriculum is social constructivism. Bitzer (2001:99) argued that the roots of social constructivism are based on the theories of Vygotsky (1962, 1978, 1993). Vygotsky's views of learning are related to the idea that knowledge is constructed by interactions of individuals within society and that thought is social in nature (ibid). It is on this element of face-to-face interaction that the South African perspective of cooperative learning is based. Built on the ideas of Vygotsky, Bitzer further argued that the rationale for engaging peers in learning is based on the notion that, because of the social nature of learning, opportunities to interact can be created and there is nothing "natural'' about an educational setting. Settings are all social in nature, socially constituted and can be socially manipulated. In my understanding, according to Bitzer, the social constructivist learning and cooperative learning are related to each other by their having a social element and they are both *social learning theories*. Through cooperation and interactions of individuals in the groups the classroom becomes the microcosm of the society where knowledge is constructed and thought takes on a social nature.

2.4.2 The relationship between ubuntu and cooperative learning

The second element that is related to cooperative learning is *ubuntu.* According to Bitzer (2001:99), based on the ideas of Mnyandu (1997), *ubuntu* is an African world-view of humaneness/humanity which has certain essential elements and the people of Africa consider it to be the most important quality of *umntu* (an individual). *Ubuntu* gives us a "balanced view", with *ubuntu* representing African communalism versus the Western individualism of liberal democracies. Liberal democracies over-emphasise the individual above the community. The main deficiency of liberal democracy is that it cannot handle race (i.e. communalism) as an element of democracy. On the other hand, the primacy of the community over the individual is best summed up by a well-known saying (of ubuntu): "I am, because we are: and since we are, therefore I am". Thus *ubuntu* is seen as an alternative view to the liberal democratic system in South Africa. The implications of *ubuntu* in cooperative learning are defended and the contents of individualism (individual rights and freedoms, personal achievements, etc.) are seen as selfishness. Related to cooperative learning, it is further argued that the individual will not succeed unless every one succeeds. Learners must work for a common goal to survive. "Once positive interdependence is established and internalised to the group's functioning, the *ubuntu* concept has a second implication, which in my understanding is learner reflect one anothers' strengths and weaknesses. This is the time to celebrate'', praising those who were assisting, helping, encouraging, etc, during the activity. Celebrating and praising members' achievements corresponds to the principle of 'group processing' an essential element of cooperative learning according to the NCS policy document.

2.4.3 The relationships between cooperative learning and OBE

The third element that is related to everyday life and cooperative learning is OBE (Outcomes Based Education). According to Bitzer (2001:101) there are three sub-elements of OBE that are related to cooperative learning, *promoting critical*

crossfield outcomes, *systems approach*, and *assessment.* They are discussed below as follows:

2.4.3.1 *Critical outcomes*

The first sub-element of OBE is critical crossfield outcomes which are related to cooperative learning. Bitzer stated that cooperative learning plays a major role in promoting critical outcomes: problem solving skills, communication skills, and personal and interpersonal skills.

2.4.3.2 *Systems approach*

The second sub-element of OBE is the systems approach which is related to cooperative learning. Bitzer stated that cooperation lies at the heart of all successful economic systems, and fostering of cooperative learning develops learners' ability to distinguish among roles, divide tasks, synergise efforts, co-ordinate systems and promote healthy and positive interdependence.

2.4.3.3 *Assessment*

The third sub-element of OBE is assessment. According to Bitzer (2001:102) cooperative learning promotes assessment. My understanding of assessment, according Bitzer, means that an opportunity is created to assess group as well as individual outcomes. Cooperative learning groups enable teachers to assess diverse learning outcomes such as skills performance like knowledge communication skills, interpersonal and small group skills.

2.4.4 The relationship between cooperative learning and African Renaissance

The fourth element that is related to cooperative learning is African Renaissance. According to Bitzer (2001:102) "African Renaissance" signifies the fusion of Africa and the West for the African continent to be reborn. By African

Renaissance Bitzer describes it as the integration of the African concept of *ubuntu* with the principles of social constructivism. Bitzer stated that the obvious point to start cultivating this symbiosis is the classroom. Learners in all teaching and learning situations, and at home, should be introduced to an ethos of the mutual appreciation of one another's cultural habits. This is where the application of *ubuntu* in combination with social constructivism offers the richest possibilities for raising a nation in the best of a number of traditions, all operative in African soil. Bitzer further argued that cooperation is impossible without cultural exchange being effected and/or fostered. Learners' interaction will prepare them for future citizenship. The interaction and shared interests will enhance the awareness of the present needs and the future problems. Learners will take note of how the well being of a society is interdependent on the caring displayed by its members.

2.5 CONCLUSION

This section is a short summary of the literature review. In this chapter on the literature review I have dealt with the phenomenon of cooperative learning as instructional techniques by 'beefing up' three cooperative learning perspectives for their conceptual and practical insights. Eight studies in cooperative learning in South Africa and other countries have been reviewed and how they relate to the framework of Bronfenbrenner's ecological systems theory has been discussed. Theoretical frameworks were also presented in detail covering issues and debates about cooperative learning as group situational learning theory. An understanding of the theory and philosophy of cooperative learning in South Africa was given. Although it is just one of many techniques that should be included in a teacher's pedagogical repertoire and should not be over used, it does possess great promise for teaching-learning if it is implemented correctly.

The next chapter will present the research methodology I used to gather the data on teachers' cooperative practices as instructional techniques.

CHAPTER 3

METHODOLOGY OF THE RESEARCH

3.0 INTRODUCTION

This chapter is structured into five (5) main parts. Part 1 covers the research orientation of this study, from the general approach to the paradigm on which this study is anchored. Part 2 covers the form of this research design, case description, case selection and how the design characterises the research topic. Part 3 presents the method of data collection, instruments like the interview schedule and recorder, and the description of the fieldwork. Part 4 presents the research quality, trustworthiness, e.g. *credibility, dependability, transferability,* and *confimability*. Part 5 is about ethical considerations. It refers to various ethical clearance forms and procedures as well as literature on ethics.

3.1 RESEARCH ORIENTATION

This section gives the orientations of this study, these orientations are expressed in terms of paradigms (refer to section 3.1.1 below). Thompson (1995:989) defines a paradigm as “an example or pattern, esp. one underlying a theory or methodology” and methodology is defined as “a body of methods used in a particular branch”. The orientation of this research rests mainly in the interpretive paradigm (refer to section 3.1.2 below). In other words this means to say that the body of methods used in this qualitative research project revolves around the interpretive method.

Babbie and Mouton (2001) explained that an interpretivist paradigm is based on the assumption that human phenomena are fundamentally distinct from natural phenomena because human behaviour creates meaning and all human actions have an element of historicity. Since this study involves working with human behaviour as opposed to working with objects, it employed interviews and

observations as the main sources of data-gathering instruments. The corresponding body of methods used with interpretive method is explained in two perspectives, the historical and philosophical orientations. The philosophical orientations are (given in 3.1.1.2 below) in three domains, namely ontology, epistemology and methodology.

3.1.1 Research paradigms

A paradigm is a basic set of beliefs that guide action (Denzin and Lincoln, 2007). Taylor and Medina (2013) clarified the term 'paradigm' as "a comprehensive belief system, world view, or framework that guides research and practice in a field". To clarify the term 'paradigm' in this study, it means the framework that determines the way in which knowledge is studied and interpreted. Two perspectives of the concept paradigm, historical and philosophical are explained below.

3.1.1.1 *Historical perspective*

Historically, the term and concept of paradigm has been attributed to Thomas Khun (Born: 18 July 1922 – Died: 17 June 1996), who controversially proposed that paradigms are a collection of "concepts, variables and problems attached with corresponding methodological approaches and tools". Denzin and Lincoln (2007:3-4) for instance said that in North America qualitative research operates in a complex historical field that cross-cuts at least eight historical moments. In the *modernist* (1950-1970) or golden age and *blurred genres* (1970-1986) moments a variety of new interpretive, qualitative perspectives including hermeneutic (interpretation process), and phenomenon (which is the teaching method) were taken up.

3.1.1.2 *Philosophical perspective*

From a philosophical perspective, Egon Guba expanded this concept by outlining that paradigms are *three-fold* in nature, shaped by epistemological (the nature of knowledge), ontological (the nature of existence) and methodological (how the researcher should go about finding out knowledge) questions (Vine, 2009).

Taylor and Medina (2013), from a philosophical perspective, also explained that a paradigm comprises a view of the nature of reality (i.e., ontology) – whether it is external or internal to the knower; a related view of the type of knowledge that can be generated and standards for justifying it (i.e., epistemology); and a disciplined approach to generating that knowledge (i.e., methodology). The type of knowledge (i.e., epistemology) in this study is the understanding of the teachers' practices of the cooperative learning approaches as instructional techniques. The nature of existence (i.e., ontology) is the question of how teachers practice cooperative learning in teaching mathematics.

3.1.2 Paradigm in which this study is anchored

This study is anchored in the interpretive paradigm. Cohen, Manion and Morrison (2007) echoed that interpretive paradigms strive to understand and interpret the world in terms of its actors with strong emphasis on meanings and interpretations. Thomas (2010) said that an interpretive researcher believes that reality consists of people's subjective experiences of the external world. An interpretive researcher assumes that knowledge is subjective (subjectivist epistemology) and participants are social beings subjected to a social world. To reiterate, ontologically an interpretive researcher assumes that social reality is the result of interactions between actors in real social contexts (ibid). According to Taylor and Medina (2013) the interpretive paradigm requires that the researcher's personal perspectives, along with those of the research participants, must be 'given voice'. In the case of this study interactions are

between the researcher and the participants, between learners, and between learners and their teachers in the context of cooperative learning.

According to Thomas (2010) interpretivism is not a single paradigm; it is in fact a large family of diverse paradigms. The philosophical base of interpretive -*+research is hermeneutics and phenomenology (Boland, 1985; ibid). First, in this study the researcher's own subjectivity is a key part of the interpretation process (hermeneutic). At the back of the researcher's mind is the question: What could be the influence of my own values and beliefs in the fieldwork on the participants and in interpreting of the thoughts and feelings of the participants? According to Hewitt (2007:1149) qualitative research is vulnerable to bias through the attitudes and qualities of the researcher, social desirability factors, and conditions of worth. Secondly, although this study is not primarily phenomenological, some of its aspects are underpinned by the principles of phenomenology which focuses on discovering and expressing essential characteristics of a phenomenon like cooperative learning as they really are. Literally, phenomenology is the study of "phenomena": appearances of things, or things as they appear in our experience, or the ways we experience things, thus the meaning things have in our experience (Thomas, 2010).

To bracket myself (the researcher) from bias and influence in this study, I have laid down the theoretical and conceptual frameworks to point the readers and consumers of research to the values and premises from which this study stems. Approved research instruments, namely, an interview schedule, an observation tool and a voice recorder were used in order to accurately capture the data, and member-checking were used to ensure the credibility of the data. Furthermore, an approval letter for ethical clearance from the Eastern Cape Department of Education (ECDoE) head office was also revealed to the participants. However, Denzin and Lincoln (2007:9) argued that an interpretive research does not allow for generalisation of the findings because it encourages the study of a small number of cases that are particular and does not apply to the whole population. Since there are contradictions within the district as some schools are achieving good pass rates compared to ones that obtained poor results, there is a need for a detailed description of cases showing how each case is different in context. So,

each case of the six schools is treated differently from the rest. The findings are not generalised to the whole district of East London. An interpretive research holds the view of the world that truth is negotiated through dialogue, in the method that I used includes myself, the researcher-and-an-interviewer (Thomas, 2010). The interview schedule, voice recorder, observation tool, narratives, such as tables to allow for many variables to be recorded as possible were used.

3.2 RESEARCH DESIGN

Research design is different from the method by which data is collected. Research design deals with a logical problem and not a logistical problem as in the method design. Research design can be thought of as the *logic* or *master plan* of a research that throws light on how the study is to be conducted (Thomas, 2010). Yin (2003a:19) adds further that “colloquially a research design is an action plan for getting from *here* to *there*, where ‘here’ may be defined as the initial set of questions to be answered and ‘there’ is some set of answers (data)”. The research design for this study is a descriptive, exploratory, interpretive case study that is analysed through qualitative methods. The use a qualitative research allows the researcher to experience a deeper understanding of the topic. Since this case study is qualitative in approach, its data is unique to the studied schools and conclusions are highly subjective.

And since there are many factors that affect performance it was therefore important to distinguish from the onset the independent variable from the dependent variable because, according to Yin (2009), the boundaries between these two may not be clearly evident as to where the problem lies. Cooperative learning is here an independent variable and performance or achievement are dependent variables. It is the translation of a real societal life situation into a classroom context. It is therefore independent of the subject content, i.e. performance in mathematics. So, this case study represents the heart of the design that involved a wide range of sources for obtaining information (Davies,

2013:56). It employed both qualitative research techniques and research instruments.

3.2.1 Case study

The case study approach makes use of multiple methods of data collection such as interviews, document reviews, archival records, and direct and participant observations and subsequently produced “thick descriptions” of the phenomena under study (Yin, 2003b). Gillham (2000a:1) defined a case study as an investigation to answer specific research questions which seek a range of different evidence from the case settings. Creswell (2002:61) defined a case study as a problem to be studied which reveals an in-depth and broad understanding of a ‘case’, by trying to understand one or more individuals. Yin (2003b) defines a case study as an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly defined. So, this study utilised a multiple case study of seven maths lessons in six schools located in three different circuits. This is also confirmed by Meyer (2001:332-333) who argued that case studies involve single or multiple cases since the problem of a single case study has got limitations and information-processing biases. But multi-case sampling adds confidence to findings.

According to Svensson and Doumas (2013:444), in case studies there is an extensive exploration and description of one or very few cases. There is no clear delimitation of investigated phenomena from a theoretical perspective. It is comprised of three fundamental characteristics. One fundamental characteristic of case studies is its contextual analysis which approaches the phenomenon of cooperative learning in an open way. Thomas (2010) noted that the “interpretivist” paradigm stresses the need to put analysis in context. The second characteristic is description. In consideration of its descriptive nature Rubin and Babbie (2001:125) stated that descriptive research can be qualitative or quantitative in nature. By the descriptive nature they refer to a more intensive examination of phenomena and their deeper meanings. The third characteristic is its exploratory nature which is the result of a need to explore sensitive, ill-

defined cooperative learning concepts in depth, taking into account the context and history (Meyer, 2001:349). To reiterate, this case study explores teachers' practices in depth on how they teach learners mathematical activities, specifically using cooperative learning as a teaching method in groupwork. I examined a case over time in detail, employing multiple sources of data found in the setting.

Case study research has been subject to criticism on the grounds of non-representativeness and a lack of statistical generalisability. Yin (2003b) argued that case studies are used for analytical generalisations, where the researcher's aim is to generalise a particular set of results to some broader theoretical propositions and this is what this study aimed to do.

3.2.2 Selection of cases

When the total number of cases to be selected is small, attention to purposive modes of sampling is needed (Seawright and Gerring, 2008:294). This research chose the cases in a purposive fashion. The basis on which cases were selected was purposeful and in two stages (school selection and maths selection). The reason for having case selection in two stages was to avoid case selection bias. According to Meyer (2001:332) there are two choices involved in selecting cases. First, there is a question of how many cases to include. Second, one must sample cases and decide on a unit of analysis. In this study the unit of analysis was the phenomenon of cooperative learning in teaching mathematics.

Stage one: Six schools were selected in three different circuits (A, B, and C) in East London. There is a 'profoundly close' relationship between poverty and achievement, such that "the more socially disadvantaged the community served by the school, the likely that the school will underperform" (Lupton, 2004:1). Therefore this study also does not rule out the fact that holds that the effectiveness of quality of teaching and learning is much affected by differences in contexts. So the four common features of these schools are: (a) All the schools are in Quintile 3. According to the poverty index of South Africa's public schools, schools are systematically arranged in terms of 'quintiles' based on their wealth, where quintile one (1) indicates 'poverty' and quintile five (5) indicates

'affluence'. That is, the poorest schools are in quintile 1 and the richest are in quintile 5. Nationally, schools classified as quintiles 1, 2 and 3 are mostly located in townships (and rural areas). They have performed more poorly in mathematics than the wealthier schools in quintiles 4 and 5. (b) All schools are under Section 21 of the South African Schools Act of 1996, i.e. schools that were declared as 'no fee' schools. That means for funding they get money in the form of provincial grants for learners, buildings and other expenditure and the compulsory nutrition programme. (c) All the schools are ordinary government schools. (d) All the schools are listed in the National Education Infrastructure Management System (NEIMS of 2007). NEIMS is a detailed information source with digital photographs about every school – the land and the buildings. This information is mapped using GIS systems (Geographical Information Systems). That means you can google or navigate to these schools.

Stage two: All seven maths lessons selected were taught in the morning. All lessons and activities used cooperative learning as a teaching method. The seven lessons observed were chosen from three different circuits in order to be able to compare and contrast performance between circuits, schools and lessons. Not all the circuits or schools in disadvantaged areas performed poorly and nor did all the learners taught under the same teaching method perform poorly. By focusing on maths performance in disadvantaged areas (rather than on differences between 'rich' and 'poor' schools as most of the existing research has done) helped to determine whether it is the difference between schools or the difference in teaching strategies that promote mastery of the subject content.

3.2.3 Case description

This is a multiple case description of six schools in three different circuits under the same district office. These schools were named FG, SI, HL, GN, SA, and DD in order to protect their identity. Likewise, the circuits were named A, B, and C. The concept of case description and interpretation is compatible with the clarification of contextual analysis (Svensson and Doumas, 2013:330-331). The compatibility in this study concerns the understanding of relations between the

demographic characteristics and the phenomenon of cooperative learning. Thus to work with contexts of learning means to consider how the meaning of these demographic characteristics are related on the meaning of the whole in a mutually interdependent way that is unique for each case.

Each school will be individually examined below as it was at the time of conducting the research during 2013 to 2014:

3.2.3.1 *School FG*

According to the statistics from the Eastern Cape EMIS the school is in circuit A of the township of East London and has a total enrolment of 936 learners for the academic year 2013. The Grade 6 learners' enrolment is 342 which consists of five classes (6A to 6E) and its teacher-learner ratio is 1:68 accordingly. There are 26 teaching staff members. According to personal communication the 2013 mathematics ANA results, Grade 6 results of this school (FG) are shown in the table below(L.S. Kota-Mgwali, personal communication, February 14, 2014):

Table 3.2 (a): School FG Grade 6 maths performance

School	Enrolment	No. wrote	Max. mark	Avg. Mark	Avg.%	Median
FG	342	311	75	23, 98	31, 97	23

In the individual assessment of the 311 learners who wrote the paper, according to the analysis of results from the East London District Office, the average percent of the learners was 31,97 percent with an average mark of 23,98 of 75 marks (L.S. Kota-Mgwali, personal communication, February 14, 2014). The achievement level is Level 1 and its CAPS descriptor is "Not achieved". This indicates that the majority of the learners did badly.

Grade 5 learners' enrolment is 365 which consists of five classes (5A to 5E) and its teacher-learner ratio is 1:68 accordingly. According to the 2013 mathematics ANA results, the Grade 5 results of this school (FG) were not submitted.

Table 3.2 (b): School FG Grade 5 maths performance

School	Enrolment	No. wrote	Max. mark	Avg. mark	Avg.%	Median
FG	0	0	60	0	0	0

3.2.3.2 *School SI*

School SI is in circuit C of the district and has a total enrolment of 372 learners and 16 teaching staff members. Grade 6 enrolment is 147 learners which constitutes 3 classes. The class ratio is 1:49 (i.e. teacher per learners). The school has only two building blocks of ten classrooms they inherited from the former government department of education. It does not have a computer lab or a library. According to the 2013 mathematics ANA results, Grade 6 results of school SI are shown in the table below:

Table 3.3: School SI Grade 6 maths performance

School	Enrolment	No. wrote	Max. mark	Avg. mark	Avg. %	Median
SI	147	125	75	22, 21	29, 62	20

Out of 125 learners who were assessed on a 75 marks ANA paper, according to the analysis of results many learners got 20 marks which is a fail. The achievement level is 1 and its CAPS descriptor is "Not achieved". They centralised around 29,62%.

3.2.3.3 *School HL*

The school is in circuit A. For its information and how to locate it, can be mapped using the 2007 GIS system. Its buildings have been expanded with two more building blocks, one for a library, science and computer labs, and one for additional classrooms. According to the statistics from the Eastern Cape EMIS the total enrolment for learners is 577 learners and 21 teaching staff. The teacher-learner ratio is 1:31. The school has an enrolment number of 94 learners in Grade 9 (refer to the table below).

Table 3.4: School HL Grade 9 maths performance

School	Enrolment	No. wrote	Max. mark	Avg. mark	Avg. %	Median
HL	94	94	140	9,89	7,06	7

Most of the learners did badly; they got 7 marks which comes to an average of 7,06%. Its CAPS descriptor is “Not achieved” and is equal to achievement level 1.

3.2.3.4 *School GN*

This school is in circuit C and for information and its location it can be found in the NEIMS of 2007 GIS system. The school looks very quiet from the outside, not because of learning going on but more because of the small number of learners enrolled at the school. It seems that the reason the school has such a small enrolment is the area and position in which the school is situated. One classroom next to the principal’s office has been turned into a computer lab. They have a local area network (LAN) connected to an administrator computer modem. They have a web-page hosted in the district office’s website.

Table 3.5: School GN Grade 6 maths performance

School	Enrolment	No. wrote	Max. mark	Avg. mark	Avg. %	Median
GN	38	30	75	29, 26	39, 02	30

According to the Eastern Cape EMIS the total number of learners enrolment in the school is 133 with 3 teaching staff members. For Grade 6 ANA enrolment as shown in the table above, there were 38 learners but only 30 learners wrote the paper. Thus, the teacher-learner ratio is 1:38. A few of the learners obtained 30 marks out of a total of 75 marks which is 40% and a pass but the whole class achievement went down from level 3 to level 2. Its CAPS descriptor is ‘’elementary achievement’’. Because many did very badly their marks averaged 29, 26 which is equal to an average percent of 39, 02%.

3.2.3.5 *School SA*

This school is in circuit B in the township of the East London district. The school information and location can be found using the 2007 NEIMS GIS system. According to the Eastern Cape EMIS, the learner enrolment is 244 and there are 8 teaching staff members. Grade 6 has an enrolment of 70 learners that consists of 2 classes. The teacher-learner ratio is 1:35. The school is fortunate in the sense that the additional number of learners come from the squatter camp outside the township. As they stay too far from the public schools, the Eastern Cape Department of Education (ECDoE) provides them with hired scholar transport. Taxi buses who are service providers bring them in the morning and take them back after school. The classroom next to the principal’s office is a computer-room. There are about 10 stand-alone computers. In ANA 2013 the Grade 6 came with the average performance result of 39, 82% as shown in the table below.

Table 3.6: School SA Grade 6 maths performance

School	Enrolment	No. wrote	Max. Mark	Avg. mark	Avg. %	Median
SA	70	60	75	29, 86	39, 82	29

The results showed that many of the learners did not pass the paper. Their performance according to the CAPS descriptors was Level 2 which is an Elementary Achievement, meaning the school failed the ANA paper.

3.2.3.6 *School DD*

The school is situated in one of the oldest areas in the town not far from the squatter camp near it. It is in circuit A and has an enrolment of 364 learners and 14 teachers. Grade 6 has an enrolment of 144 learners divided into 3 classes with a teacher-learner ratio of 1:38. The school has two blocks of buildings, five classrooms in each, a staff room and the principal's office. This school only submitted the English First Additional Language ANA paper according to the captured information by the district's curriculum section. This school on the mathematics ANA, the district office did not capture its Mathematics ANA results together with other schools. Both two ANA papers were not submitted.

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The reader will recall that the East London district was among the few districts in 2012 that were marked with an asterisk meaning that the average mark should be interpreted with caution due to capturing rates of less than 50% (DBE, 2012:58). Again in 2013 it seems there was poor capturing according to the data from the district office as shown by the tables above and below.

Table 3.7 School DD Grade 6 maths performance

School	Enrolment	No. wrote	Max. mark	Avg. mark	Avg. %	Median
DD	144	0	75	0	0	0

It was explained that some schools just did not submit the results or meet the deadlines. This was hidden in the minister's 2013 ANA report. So all in all no ANA results for this school were available for mathematics.

3.2.4 Description of fieldwork

Fieldwork started by clearing the initial hurdle of gaining entry or being accepted into the selected schools to observe and conduct interviews with participants (Mavundla et al., 2009:397-398; Belousov et al. 2007:162 &165). Teachers when absorbed by their everyday work perhaps can display mounting annoyance with researchers who are regarded as 'outsiders' or people who take up their time. Denzin and Lincoln (2007:1) argued after Smith (1999) that "the word research itself is inextricably linked to European imperialism and colonialism. It stirs up anger, silence, and distrust". From the once colonised people it "serves as a metaphor for colonial knowledge, for power, and for truth. And it is one of colonialism's most sordid legacies". So, schools were identified and permission was sought from the Eastern Cape Department of Education (ECDoE) as 'gatekeepers' to ensure that a good rapport was maintained between the researcher and the participants in conditions characterised by a difficulty to access data. Permission to conduct research in the Eastern Cape Department of Basic Education (ECDBE) was granted by the Director: Strategic Planning Policy Research and Secretarial Services.

In light of the failure to establish good rapport with participants, a decision was made at that point to terminate or not to conduct the interview or observations. For instance in school DD7 a second maths teacher was sceptical whether to say no or yes as if I was an undercover spy of the Department. It came to my understanding later in the final analysis of the raw data from the district office

that the school did not comply as per submission of the ANA results. He acted to avoid anything which pointed to and might result in a charge for non-compliance. In general, there were no threats or foreseeable threats in continuing and doing the fieldwork. I administered the ethics' research confidentiality and consent form to the respondents to read and sign as a determiner if they agreed or did not agree to participate.

3.3 METHODS OF DATA COLLECTION

This study employed a qualitative approach by incorporating a variety of data collection techniques. According to Fraenkel and Wallen (2009) there are three main techniques used by qualitative researchers to collect and analyse data and these include observing people as they go about their daily activities and recording what they do; conducting in-depth interviews with people about their ideas and opinions and their experiences; and analysing documents. Roller (2014) looking the alternative sources of information outside the data we gather in in-depth interviews, or observations argued that it "is important to the integrity of our research designs" and how it "can contribute to a more balanced as well as more robust and meaningful analysis rather than relying on study data alone". In this study there were two main methods and other methods of data collection used. The main methods being interviews and observations; and other methods are document, archival record analysis, and field notes.

3.3.1 Instruments development

According to Kington, Sammons and Regan (2011: 110) research instruments are developed and designed to respond to the research questions. The data was collected using the following research instruments.

3.3.2 Instruments used in this study

In this study two types of instruments were used. These were the Observation Tool (see Appendix 5) and the Interview Schedule (see Appendix 6) as instruments. Observation tools are technically measurement devices. They use a method of counting, totalling, and analysing responses and behaviours.

3.3.2.1 *Interview schedule*

The purpose of the interviews was to conduct an in-depth study of participants' practices of using the cooperative learning instructional techniques. (This study adopted the definition by Seymour (2001:157) that the term 'participant' connotes an equal and active engagement in the process and outcomes of the research whereas the term 'respondent' indicates a passive, responsive role in relation to the project). In order to be able to do this I developed and designed a semi-structured, in-depth interview schedule to interview the participants. The interview schedule served as the primary resource for the interview questions. The reason for choosing semi-structured interviews for this study was to probe deep into the participants' teaching practice regarding cooperative learning. All the questions were written in English, and the researcher conducted the interviews in English but some participants were permitted to express themselves in IsiXhosa. IsiXhosa was thus allowed in and translated by the researcher later into English. A rigorous process was used to ensure the accuracy of the transcripts by comparing each transcription to the audio recording. Participants were allowed to talk until they had nothing to say anymore. Each interview lasted not more than 60 minutes by following the interview schedule.

The issue of building trust between the researcher and the participants becomes very important (Meyer, 2001:336), so I made up an interview schedule that consisted of two main parts. The first part was an introduction with four steps. In the first step of the introduction the purpose of the interview was clearly stated: to

conduct an in-depth study of the teachers' practices of cooperative learning as a teaching method. In the second step the interviewees were guaranteed anonymity and confidentiality that their responses would be used for academic purposes only. This was because some participants feared that their input would be disclosed without disguising the information source. The rules and regulations of the University of Fort Hare's Research Ethics Committee (UREC) were an important prerequisite to disclosure. Their rights to agree or disagree or withdraw if they felt like it or if they did not want to be recorded were confirmed. Hence, it became important to communicate how I intended to use and store the information. The third step requested permission to record the interview in order to accurately capture what they were talking about. To accurately capture the conversation with the participants, a BlackBerry voice recorder was used in order to enable the data to be synchronised and stored on a computer media player and then later transcribed onto a typed-written transcript. The fourth step gave the respondents the opportunity to ask questions.

The second part of the interview schedule contained the interview questions which consisted of three sections. Section A looked for data on the demographic characteristics of the participants, like the distribution of participants by gender, highest level of academic qualification, post level, years of teaching experience, grade and subject teaching. Section B looked for data on the methods of teaching. It captured the principles of cooperative learning as discussed in the literature review. Section C looked for data that responded to the research sub-question in order to capture practices that promote social skills and mastery of the subject content.

3.3.2.2 *Observation tool*

This observation instrument is a tool that organises and records different elements of cooperative learning. The purpose of recording is to count the number of times an element of cooperative learning behaviour is noticed. As an instrument it is technically a measurement device that records frequency observations by using a method of counting, totalling, and analysing behaviours.

A total of six maths lessons were observed in five schools, namely, FG, SI, HL, GN, and SA. Observations of these lessons took place during tuition time. The observations were all done in the morning. They captured the five principles of cooperative learning as discussed in the literature review by Johnson and Johnson (2009).

3.3.3 Other research techniques used in this study

Two different research techniques for collecting data were used, viz. document analysis and field notes. These techniques are presented below.

3.3.3.1 *Documents and archival records analysis*

This study employed the review of documents and of records and document analysis. According to Denscombe (2008:220) when documentary sources were studied, it was of cardinal importance that they be evaluated in terms of the criteria of usefulness, namely authenticity, credibility, representativeness and meaning. As mentioned earlier on in the research design section, cooperative learning is here an independent variable and performance or achievement are dependent variables. So, this study utilised records at school, district and national levels used by the Department to keep records of ANA, grade summary of the results for learner progression to review learners' performances and the minister's report on ANA. These archival records were identified and analysed in order to obtain sufficient and credible data in correspondence to the National and Curriculum Statement (NCS) and Curriculum and Assessment Policy Statement (CAPS) policy documents.

The first thing I got from the CAPS document was that in the third term work schedule cooperative learning group work is used as a teaching method of assessment in teaching learners 'data handling'. The second thing was the district ANA record of results, namely, in school DD, the ANA results were not available. That was the reason why when I could not find information at the school, I decided to seek it from the District Office subject advisor, exam section

and education specialist. I requested a list of schools' ANA mathematics performance record from the district office and it was not readily available. What I got was only the raw data in the form of a spreadsheet given to me by the office of the curriculum Acting Chief Education Specialist (A/CES) with the apology that, since there was no precedence of such information, they had just started devising such an information document in 2013 and it was incomplete because some schools without approved reasons decided not to submit their ANA performance results. It was through this spreadsheet that I found that school DD did not submit its ANA maths results. Thirdly, I found that in the 2012 ANA report East London was among those districts that were marked with an asterisk saying "in cases with an asterisk (*) the average mark should be interpreted with caution due to capturing rates of less than 50%" in 2012 (ANA, 2013:72). This happened again in 2013 but the education minister decided to exclude this from the report.

3.3.3.2 *Field notes*

These observations were enhanced by field notes. Yin (2012:1592) describes feeling in field settings. He uses the term 'feeling' to refer to a wide range of sensations, thoughts, and intuitions that provide "clues for interpreting what is transpiring in a given situation" but need to be "corroborated (or challenged) by other data". Field notes, firstly, helped in this study to note that maladministration was prevailing in all the schools. More especially in this study field notes complemented as the information I got during the arrangement of the appointments and interviews. Secondly, through field notes it was important to note down the observations of the teachers' persona.

According to Kington et al. (2011:111) descriptive comment on the teacher's persona is one of the qualitative research components. For instance, regarding participant DDP7, the researcher arranged an appointment with this participant after having disclosed the purpose and confidentiality of the study. On the appointed interview date and time, after he had postponed the appointment twice, he changed his mind and told me to give him the questions so that he could answer them at home. I (the researcher) explained that the questions were not closed questions; they were open ended questions and that a next question

followed from the response-answer. Apparently he changed and opted that I should write the answers. When I went back to do the follow-up probing questions, he told me that he was busy and I must phone him again to arrange our meeting. He was ignoring my calls and text-messages after which I ended up with his thin data. Metaphorically, we went in a wide circle just to tell me either he was scared to be recorded or he had got nothing more to say.

3.4 RESEARCH QUALITY

The quality standard that is employed in this qualitative research design to regulate the interpretation of data in meaning that construction covered the issues of trustworthiness, such as reliability, validity, and consistency. The necessity for such careful measures stems in part from the regular use of researcher-created instruments and the researcher as an instrument. In order for the researcher to increase accuracy and trustworthiness in this qualitative case study research, the researcher used a combination of multiple credibility strategies: triangulation and member checking (Denzin and Lincoln, 2012:3).

3.4.1 Trustworthiness

This section replicates aspects of the criteria for judging good quality research by Lincoln and Guba (1985), and Guba and Lincoln (1994) in Reid and Gough (2000:75). According to Reid and Gough the *traditional* (1900-1950) model of trustworthiness applies in qualitative research approaches. This model of trustworthiness is called the universal criteria for judging qualitative research. On the other side the socio-cultural perspective, *modernist* or golden age (1950-1970) and *postmodernist* (1990-1995), contend that there can be no criteria for judging qualitative research outcomes (Denzin and Lincoln, 2007:4). The conceptual proliferation of differences in researchers (i.e. lack of consensus) is the result of the paradigm shifts in the recent history of qualitative research. Lincoln and Guba's criteria (table below) are appropriate for forming guidelines for the evaluation of qualitative research. Nevertheless, each reader has a

choice among these criteria that are presented here, or the reader may prefer an alternative which in this section is not discussed.

Data in the interpretive tradition is assessed in terms of trustworthiness criteria including credibility, transferability, dependability and confirmability (Gephart, 1999). Lincoln and Guba's (1985) four criteria for establishing the trustworthiness of the data, namely true value, consistency, neutrality and applicability are presented below.

Figure 3.1: Trustworthiness model

Criterion	Qualitative approach
True value	Credibility
Consistency	Dependability
Applicability	Transferability
Neutrality	Confirmability

***Source**:* Polit & Beck (2004:430), based on Lincoln and Guba (1985).

To establish trustworthiness this study appealed to Lincoln and Guba's four criteria of (a) credibility, (b) dependability (c) confirmability and, (d) transferability.

3.4.1.1 Credibility (true value)

Lincoln and Guba (1985) hold that credibility involves two aspects: first carrying out the study in a way that enhances the believability of the findings and, second, taking steps to demonstrate credibility to consumers. As a researcher the way of establishing credibility was by going back to the respondents themselves and asking them to read and discuss the construction derived from analysis. I (the researcher) used triangulation of data collection techniques and research designs.

I as a research instrument used Lincoln and Guba's (1985) member checking to establish the credibility of data collected. This practice prolonged engagement with the participants. Bracketing was necessary during the stage of interviewing in order to conceal my own knowledge of the undertaking. Feedback was given to the participants for confirmation and clarification during transcription. According to Meyer (2001:345) triangulation and use of feedback (i.e. member checking) strengthens the credibility of the data. (By feedbacks she meant returning to interviewees with interpretations and developing theory and actively seeking contradictions in data). As earlier mentioned (in section 3.1 above) the term 'participant' connotes an equal and active engagement in the process and outcomes of the research whereas the term 'respondent' indicates a passive, responsive role in relation to the project (There is cooperation and mutual interaction between the researcher and the participants; like group members in a school project there has to be a feedback as a principle). The triangulation procedure basically entailed gathering and analysing data in more than one way (Carlson, 2010:1104. Since data was collected from different participants at different times (from the fourth school term 2013 to the first school term 2014) and from different schools. It was collected in three different ways such as interviews, observations, and archival data).

Member checking is basically what the term implies – an opportunity for participants (members) to check and approve particular aspects of the interpretation of the data they provided. Participants may be asked to edit, clarify, elaborate, and at times, delete their own words from the narratives, although Creswell (2009:191) stressed that member checking is best done with 'polished' interpreted pieces such as themes and patterns emerging from the data rather than the actual transcripts. Member checking is often a single event that takes place best only with the verification of transcripts or early interpretations (Carlson, 2010:1105). Furthermore, my supervisor as an expert in this field also monitored the credibility of this study.

3.4.1.2 Dependability (consistency)

It is unanimously agreed that Lincoln and Guba's (1985) description of dependability means the consistency of the findings in the case where and when the study is to be replicated with the same participants or in a similar context. For example, a research study is dependable hence the research methodology must be described in detail. The interview schedules, the recorded voice-notes, the original transcripts, and the consent forms are made available for audit in the case of any event (The reader is referred to the appendices of this study for some of these documents). Auditing happens during the scrutinising of the data and its support materials by a different researcher.

According to Meyer (2001:348) reliability focuses on whether the process of the study is consistent and reasonably stable over time and across researchers and methods. In the context of qualitative research, reliability is concerned with two questions: Could the same study carried out by two different researchers produce the same findings? Also, could a study be repeated using the same researcher and participants and yield the same findings? She further argued that the problem of reliability in qualitative research is that differences between replicated studies using different researchers are to be expected. However, while it may not be surprising that different researchers generate different findings and reach different conclusions, controlling for reliability may still be relevant (ibid).

Whilst other authors (Creswell, 2009:191; Denzin and Lincoln, 2012:3) argue that when accounting for reliability and validity of the data, reliability being an examination of the consistency of responses, to increase the consistency and reliability of a qualitative research, the researcher will check interview transcripts for obvious mistakes. According to Meyer (2001:345) construct validity can be strengthened by applying triangulation and use of feedback as discussed in the previous section.

However, Meyer (2001:343-344) argued that the problems of validity in qualitative studies are related to the fact that most qualitative researchers work alone in the field and they focus on the findings rather than describe how the

results were reached. The problem with the validity criteria suggested in qualitative research is that there is little consistency across the articles as each author suggests a new set of criteria. She (ibid) further argued that "construct validity refers to whether there is substantial evidence that the theoretical paradigm correctly corresponds with observation. The great strength of qualitative research is the validity of data obtained because individuals are interviewed in sufficient detail for the results to be taken as true, correct, and believable reports of their views and experiences, and to validate the records from the participants and school against the requested information on results from the district officials, namely, the mathematics subject advisor and curriculum education specialist.

3.4.1.3 Transferability (applicability)

Transferability refers to the degree to which the findings can be applied to other contexts and settings thus generalising the findings to a different population. Lincoln and Guba (2005) suggest that transferability is dependent upon the degree of similarity between two contexts. Others suggest that the researcher should provide sufficient contextual information to make similar judgements possible by others (Ibid). I have designed a research project in which multiple cases, multiple informants/more than one data collection method are used in order to strengthen the study's usefulness for other settings. However, in this study each case is unique and therefore their findings could not be generalised. Even though I have provided sufficient descriptive data to allow comparison, this was necessary to enable others to reach a conclusion on whether a transfer could be made. Research methodology has been described. The demographic data as well as the description of the setting are discussed in detail in chapter 4 as part of the findings.

3.4.1.4 Confirmability (neutrality)

Confirmability requires one to show the way in which interpretations have been arrived at via the enquiry. Lincoln and Guba (1985) stated that confirmability is

established by developing an audit trail. They (ibid) argued that confirmability is established when credibility, transferability and dependability are achieved. It is unanimous among all researchers that confirmability must relate to the recording of the data and findings that are so clear that a non-researcher can follow so that the interpretation does not become a figment of the researcher's imagination.

Trustworthiness is largely an issue of presentation. Rolfe (2004:305) argued that "dependability is a threat to credibility because Guba and Lincoln (1989:239; ibid) regarded member checks as the 'single most critical technique for establishing credibility. Furthermore she argued that if dependability meaning consistency is assumed to be 'multiple and constructed', then 'repeatability is not a necessary practice or strategy to satisfy this criterion, because no expert can be expected to arrive at the same themes and categories. To put it simply, Rolfe argued the idea that any attempt to increase consistency involves a forced confirmability in the analysis of the data, and which is at the expense of the credibility. Therefore, Rolfe rejected reliability as a useful measure of quality in qualitative research favour of credibility or trustworthiness. She posited that credibility is achieved through consensus on each individual study rather than by the blanket application of predetermined criteria. Nevertheless, her arguments were based on the continued failure to agree on universal criteria for judging quality in qualitative research.

3.5 ETHICAL CONSIDERATIONS

To be interviewed, for example, in-depth and on a sensitive topic relating to your job, especially, can be experienced as intrusive and distressing. Furthermore, the relationship that develops between the researcher and the participants (i.e. teachers) brings with it additional ethical demands such as confidentiality and anonymity. According to Smith et al. (2013:14) the researcher must declare any foreseeable conflict of interest with respect to the research. For ethical considerations this study gained ethical approval in respect of its undertakings mentioned in chapter 1 and its research instruments from the University of Fort Hare Ethics Committee (UREC) and the Eastern Cape Department of Education (ECDoE).

Permission was granted by ECDoE and UREC ethical clearance letter to go conduct this study were given in writing likewise. For such considerations the participants were shown the 'clearance letters' and the the Informed Consent Form. The principles of informed consent, confidentiality and anonymity to protect the dignity and rights of the participant were applied. I also disclosed that I (the researcher) will use pseudo-names; their real names and of schools will remain anonymous. So the rights of participants were protected during the processes. All participants were informed that participation was voluntary and that they could withdraw at any stage if they wished without giving reasons for doing so.

3.6 CONCLUSION

This chapter has outlined the research's orientation. It discussed the research paradigm and the research design. The research design used in this study was a descriptive, exploratory and qualitative. A detailed description of six cases was given in this chapter. Methods of data collection, strategies and the design used included participants, data collection instruments (i.e. interview schedule and observation tool) and research techniques (i.e. document and archival records analysis and field notes). The research quality was also discussed covering issues of trustworthiness such as credibility, dependability, transferability and confirmability. Ethical considerations were also given consideration by referring to various ethical clearance forms and procedures as well as literature on ethics.

The next chapter focuses on data presentation and analysis.

CHAPTER 4

DATA PRESENTATION AND ANALYSIS

4.0 INTRODUCTION

In this chapter the data that was collected during the interviews is analysed using the principles and characteristics of cooperative learning in order to see and examine the cooperative learning practices used by the teachers in the schools that participated in this study. This data is presented in the form of tables and themes, structured into three parts, namely: (1) Demographic characteristics of participants; (2) Cooperative learning practices of mathematics teachers; (3) Practices that promote positive attitudes, social skills, and mastery of subject content; and then the chapter is rounded off with the conclusion.

4.1 DEMOGRAPHIC CHARACTERISTICS OF PARTICIPANTS

The gender distribution of participants for each of the interviewees of the six schools is illustrated in Table 4.1(a). There was a total of four males and three females which made a grand total of seven mathematics teachers as participants of this study shown in the table below.

Table 4.1 (a) Distribution of participants by gender

	Sex		
School	Male	Female	Number
FG		2	**2**
SI	1		**1**
HL		1	**1**
GN	1		**1**
SA	1		**1**
DD	1		**1**
Total	**4**	**3**	**7**

Out of six schools, in one school I managed to get two participants and in the other five schools I managed to get one participant per school to have seven participants. The following Table 4.1(b) gives an illustration of the distribution of the academic and professional qualifications as per each of the participants.

Table 4.1(b) Distribution of participants by highest level of academic qualification

	Highest Qualification				
Participant	ACE	BEd	BEd (HON)	MEd	Number
FGP1	1				1
SIP2			1		1
HLP3	1				1
GNP4				1	1
SAP5	1				1
FGP6		1			1
DD7			1		1
TOTAL	3	1	2	1	**7**

This table illustrates that all participants are holding academic teaching qualifications, the four lowest qualifications being a university fourth year-level qualification, namely ACE or BEd, followed by two fifth year-level qualifications, BEd (Hon), and one sixth year-level qualification, MEd, the holder of which happened to be also a school principal. The rest of the participants are post-level one teachers. HLP3 is the only high school teacher who also teaches matric mathematics, is a senior exam marker and a private tutor.

Table 4.1(c) Distribution of participants by post levels

	Post Level				
Participant	Principal	Deputy-Principal	H.O.D	Teacher	Number
FGP1				1	1
SIP2				1	1
HLP3				1	1
GNP4	1				1
SAP5				1	1
FGP6				1	1
DDP7				1	1
TOTAL	**1**	**0**	**0**	**6**	**7**

Table 4.1 (c) shows the distribution of participants by post level. Six out of seven participants are in post level 1 which means teachers. The research only managed to draw one principal in school GN and a mathematics teacher. According to GNP4, the Schools Act policy on staff establishment states that when the enrolment is small principals manage the school and do teaching as well.

Table 4.1 (d) Distribution of participants by grade levels taught

	Grade Level	
Participant	Grade	Number
FGP1	7	1
SIP2	7	1
HLP3	10, 11 &12	3
GNP4	5, 6, & 7	3
SAP5	6 & 7	2
FGP6	5	1
DDP7	5, 6,& 7	3

Table 4.1 (d) shows the distribution of participants by grade levels. This further shows how many grade levels one is responsible for and that means the work load in terms of subject planning and teaching strategies in order for the class to reach the mastery of the subject. Three participants teach three different grades. Another three teach a single grade. Only one participant teaches two different grades.

Table 4.1 (e) Distribution of participants by other subjects

	Other Subjects	
Participant	Learning Area	Number
FGP1	0	0
SIP2	EMS, CA and English	3
HLP3	0	0
GNP4	EMS & Computers	2
SAP5	NS &Tech and English	2
FGP6	Life Orientation	1
DDP7	0	0

Table 4.1 (e) illustrates that only three participants teach only mathematics. The distribution into other different subjects other than maths shows that two participants teach two or more different subjects other than maths; one teaches three or more subjects other than maths; one teaches one more different subject other than maths.

Table 4.1 (f) Distribution of participants by years of experience

	Years' Experience					
Participant	<5	5>10	10>15	15>20	> 20	Number
FGP1					1	1
SIP2				1		1
HLP3				1		1
GNP4				1		1
SAP5			1			1
FGP6	1					1
DDP7	1					1
TOTAL	2	0	1	3	1	7

Table 4.1 (f) shows the distribution of participants by years of general experience in teaching. Starting from the most number of participants, three participants have between 15 to 20 years of teaching experience; two participants have between 1 to 5 years; one has between 10 to 15 years; another one has over 20 years' experience. There were no participants with between 5 to 10 years experience.

4.2 COOPERATIVE LEARNING PRACTICES OF MATHEMATICS TEACHERS

This section includes categories which capture principles of cooperative learning in the classroom as discussed in the literature review. Internationally, Johnson, Johnson (2009) identified five basic elements of cooperative learning, while Kagan (2009) speaks of four elements of cooperative group activities that clearly define the difference between cooperative learning and just mere groupwork.

The South African national curriculum statement gives six characteristics of effective cooperative learning activities. For the purpose of this chapter, I have identified five of these principles which speak for all of the said principles above. The first principle is positive interdependence.

4.2.1 Positive interdependence

In looking at all the responses of data that speak to this principle of positive interdependence all the exponents of cooperative learning agree it is based on the studies of cooperation as opposed to conflict. This principle states it clearly that the aims and objectives of any activity cannot be fully met unless all the learners cooperate with each other. Otherwise:

> "You'll find that, it maybe a fruitless endeavour throughout in that whole discussion. Your goals or what you think that you were going to achieve at the end will become nil... take data-handling, for instance, if we want a person to collect data, we want an organiser, *etcetera, etcetera...* They must cooperate with the leader to achieve the results of the group otherwise if they don't, they going to be delayed and they won't get them out" (**FGP1: Dataset**).

In order for the group to achieve its goals the group members need and ought to pool their efforts. In order for this to happen, the class-teacher, sometimes group leaders, assign roles to group members:

> "If for an example, they are doing the exchanging of one currency into another currency, one will have the calculator and another one make sure that they all understand the question, will be asking questions. So they all have to come up with different inputs into, into the group….. There is going to be a group leader that will assign duties to all of them" (**SIP2: Dataset**).

The same applied to HLP3 who said:

> "You group them according to their abilities but cannot take gifted learners together at least they must have a group leader. That group leader is the one that is going to see to it that in their activity learning is taking place. Like, you take a gifted, take a mediocre come up with a mixed group of cooperative learning" (**HLP3: Dataset**).

The sharing of questions also builds a sense of interdependence for the learners so that they need each other to complete the task, otherwise there's bound to be a conflict of interests among group members. In order to boost learners' performance and appraise best performance amongst groups, some teachers use rewards. For example:

> "If they finish earlier than the others, they get recognition from the class and then they are given more task" (**SIP2: Dataset**).

FGP6 gave a similar response by saying:

> "Those decorated stars, when they did well I would tell them give members on your group and in order for me to recognise your group and give the whole group a star. You must see to it that the members of your group are well behaved" (**FGP6: Dataset**).

Nevertheless, interdependence seems to create better results in terms of learner achievement and group members' relationships. GNP4 gave a response that also confirms interdependence among learners:

> "whereby they (learners) have roles to play. After roles to play they work in groups, doing their tasks cooperatively, that is working together, whereby one would be a scribe, one would be a chairperson, but helping each other in the process of learning" (**GNP4: Dataset**).

Likewise, participant SAP5 told how he goes about creating interdependence among learners. He said, he:

> "democratically allow learners to elect a leader and a scribe. These (roles) should rotate every day. Give clear explanations on what to achieve and specify time limit. Give time for reporting and feedback. Round up with a generalisation and/or adoptions on the lesson... Assign group tasks of varied levels of difficulty. Swop the tasks. The leaders collect resources" (**SAP5: Dataset**).

Also, FGP6 showed that the reason behind positive interdependence is participation, and participation goes with responsibility:

> "Everyone in there (group) needs to take a responsibility; you set that from the very onset when learners come to your class, you make them know that this is what is going to happen and everybody when the time comes for someone to report...one has a role to play and knowing that I will get a mark because I've

worked for it. In, I'm not going to get a mark because the group has done well. I'm going to get a mark that I've worked for" (**FGP6: Dataset**).

DDP7 also shared his practice of cooperative learning by saying that he:

> "divides the class into group of six and each group has a leader. Each group member is assigned a task but each member can help one another. Time is set for the completion of the task. Weaker learners are distributed in various groups. Each learner is encouraged to be responsible for his or her task" (**DDP7: Dataset**).

4.2.2 Individual accountability

The principle of individual accountability is manifest in four of the participants in the data. Individual learner role plays a crucial role in the contribution of the whole group effort. If indivividual roles are not assigned there is bound to 'free-riders', for instance, SIP2 said in order to guard against 'free-riders':

> "If they do the calculation in a, in group sometimes it is not easy to pick-up mistake. But somebody who is doing the calculation there they should watch the steps as they unfold...it can be problematic, in that, there are those that'll not be active and they will be passive. They won't participate in a group; they look at group work as something where the teacher is not excellent and allow others to do the work" (**SIP2: Dataset**).

HLP3 shared a similar experience of learners who are loafers. She said in order to handle such off-task behaviour that:

> "For instance, if you give learners something to do and then they come with it not done you discipline the learner like by giving more work within the period of time or call the parent to school and deal with the parent ...when you see that the learner is not that much into sharing, you discuss the matter with it. May be the learner will bring you its problems, whatever, then now you can try and show it how to share. Sometimes you will find out that child is grew up a single child at home and really doesn't know a thing on how to share"(**HLP3: Dataset**).

According to GNP4, the issue of individual role and participation, since it comes with accountability:

> "It should be discussed as a group and be known as a norm. Knows that, they, I must work hard, because my work, my participation will be evaluated, you see...Because at the end of the day my work will be evaluated by the group that how much input have I put in this group... It should be a norm brother and be a known by group, and it should be known as a class as well, yes, your contribution you see? Your participation in the group... So, sometimes we both to have i-sharing, but yet again we should look at individual performance" (**GNP4: Dataset**).

FGP6 also endorsed that:

> "Whereas they are working in the group but you need to consider individual participation, because some may leg knowing that we are going to get whatever the others are getting" (**FGP6: Dataset**).

4.2.3 Face-to-face promotive interaction

Since cooperative learning is learner-centred the principle of face-to-face interaction rests on the essence of group work - learner participation as opposed to the teacher-centred banking method. According to FGP1 there are more gains when learners are interacting with each other:

> "So by also giving group work or group discussion, it's now givingchance now to the other learners because when learners they discuss something amongst themselves they get confidence...secondly, they share ideas... it helps them to be free in their sharing of, lanto, of knowledge...the disadvantage of the telling method is that, mostly, the information comes from you as a *ntoni?* as a teacher. So, the learners mostly they are passive because they are just taking-in a, residues of rating what, of producing what you are *ntoni?* you have given them. And you will find-out, for instance, it doesn't give any chance for them to become *ntoni?* to become active" (**FGP1: Dataset**).

Learners enjoy cooperative groupwork according to some of the responses because participation seems to be at a maximum as learners are sharing knowledge, helping each other. This principle Kagan calls 'simultaneous interaction' because all learners are actively involved at the same time as opposed to a banking method where, if one learner answers the question correctly while all the others are or not listening or participating, the teacher will continue. But it is instead not so because according to SIP2 group members:

> "They're reminding each other on, on the details, on the information that they need to have. Or they remind each on the steps that have to be taken during certain calculation. They enjoy it instead of me leading them and asking them questions, sometime they become shy and don't want to raise-up their hands. Or they are afraid of speaking in-front of the whole class... They put the desks together, so they can keep the eye contact, they can work in very simple, in that small group, and they know it exactly what needs to be done....Eye contact is there. If questions are raised, they are raised within the group, clarity comes from certain groups, and the group leader is here with them. And the group leader will make sure that they move, they keep moving and not staying in one pace, in one thing for a long time... I will say, they enjoy it and they participate, they enjoy it more when they achieve quicker than others. So, if one learner is quick doing that, and then, they look around to see who is struggling. And then, that is when they help each other... So, they all do the classwork, and then, mmm, they finish and help one another" (**SIP2: Dataset**).

Learner-centred interactions, however, seem to be promoting learning when learners use encouraging efforts to support each other by sharing knowledge and creativity. Learners' different learning styles can be accommodated:

> "For instance, another learner perhaps may not understand something, but by grouping them together to teach each other, that same particular learner will the same thing realise that this thing is going like this and this, reinforcing that learner to understand and even change the attitude to better understanding" (**HLP3: Dataset**).

But during the implementation of cooperative groupwork practitioners of cooperative learning must distinguish between cooperative groupwork and just group work. GNP4 in sharing his experience said that:

> Sometimes I would see, mmm, even within other school, even within my school learners are placed according to desks.... They think that, that seating as a group, they think that it's groupwork. It's not group work, you're just seating as a group they are not working as a group" (**GNP4: Dataset**).

The principles of cooperative learning distinguish cooperative learning from group work. It seems it is when all these principles are put into action that cooperative learning can be effective; otherwise learners can miss out its essential characteristics and the benefits:

> "Learners learn a great more and are free to express themselves. They hardly forget what they teach each other" (**SAP5: Dataset**).

It is evident from the data we get from FGP6 that self-esteem is influenced and changes from negative to positive, for instance:

> "these learners come from different backgrounds, they have different learning styles, and they have different abilities. So, for that learner who is under-performing, who is an under-archiever being in at, oh, being at, used to this learner who has some sort of high-ability, this learner plays a role in trying to pull this one to the level though it might not be, be pulling to the level but you will find out that as learners one might be able to, 'so-and-so said this, so-and-so explain that this is that I can remember I didn't know how to deal with this, but so-and-so bring an idea of how I can tackle it in an easier-way" (**FGP6: Dataset**).

It seems, according to the data, that the participants divide tasks and resources during group work so that all learners are kept on task which is very important during groupwork. DDP7's response confirms that it has gains of a conducive learning climate when:

> "Members of the group help one another to perform the tasks... The advantages are that each learner gets peer support and this gives him or her confidence to perform more" (**DDP7: Dataset**).

Talking about how learners play an active role during group work, the principle of promotion and face-to-face interaction speaks to such things as off-task behaviour, how learners share knowledge and resources and how learners teach and assist each other.

4.2.4 The appropriate use of social skills

In order for a cooperative group to be effective, learners ought to have and use various skills. This is confirmed by the data, for instance, how learners acquire these predispositions that are essential outcomes of these groupwork activities. If learners are prepared for the workplace environment without the opportunities that cooperative groupwork offer, they will never be able to function effectively in this context after school. FGP1 said:

> "The method although it's about the subject-matter but at the end of the day learners are gaining more and that indicated the communication skills, the confidence, the listening skill, the leadership skill, respect, to be tolerant also

> towards others...Some they may fear even to be able to communicate with me. But now, when they are discussing among themselves, so you are also building in confidence on those learners who don't want to participate, and also you are building *i* confidence on those learners who already know" (**FGP1: Dataset**).

Groups cannot function effectively if students do not have and use the various needed skills. Regarding this principle of 'interpersonal and small group skills', it seems according to the data that teachers ought to teach learners skills in order for them to be able to reach their goals. They must teach learners these various skills purposefully as academic skills. According to SIP2:

> "The skills that they learn from working as a group they learn to respect one another, they learn to listen when another one is talking, they learn to be, they learn to be detailed because when they have to do the actual task, that is where they focus on the details, to achieve the goal at the end of the task they need to have focused on all the details" (**SIP2: Dataset**).

These skills cannot be learned by a learner in isolation; they learn them through interacting with others and they can be observed in action. From all the teaching methods that they use in the classroom, only this strategy is able to provide learners with the opportunity to expose learners to various skills. This method:

> "promotes social skills because by interacting with different people from different perspectives it gives them that insight of care, how to deal with different people, because people come in different forms... it also prepares them for public speaking, because when they, when those rules rotate some particular time one will have to be the speaker, and he has seen how others conduct themselves when they respond back and it make those who are shy to try by telling the story that at least if so-and-so is doing it like this well let me try it as well for change and for the better" (**FGP6: Dataset**).

Also HLP3 mentioned the advantages of implementing this principle during cooperative group work. She said:

> "they learn more because you will find out that some are gaining more information, they gain knowledge and skills, in their groups...strengths is where they gain knowledge, skills, teaching... I think the advantages are learners are gaining communication skills and find out now they know how to communicate as an advantage. Even listening to each other, they can now listen to each other when they speak in these groups... and also being able to analyse something when you give them something to analyse because they learn from other

members of the group. I think even solving problems as well they know how to" (**HLP3: Dataset**).

This principle was again manifested by GNP4 that learners need to know how to tolerate each other during group work, especially during group discussions. They need to give each other turns to speak without feeling intimidated by those who are esteemed as high-achievers. As GNP4 said:

> "listening to other people, different perspectives, handling different perspectives of issues, respecting other people's ideas... So I think they are learning skills whereby other learners they are developing skills of reporting, skills of being a scribe, skills of chairing group, of doing task, you see? So, those skills, those are the skills that they are learning, because the tasks they have are rotate, not the same people over and over again. So, they are the skills they need before team, being a scribe and chairing the group, yes" (**GNP4: Dataset**).

This principle was also evident from SAP5's response on the use of skills during group work. He put it this way, learner-to-learner interaction:

> "develops social and interpersonal skills. It enhances teamwork... they learn to accept and respect each other... Interpersonal skills, communication skills, self esteem, ability to substantiate their own views, and social leadership.In order to have a smooth running and operation of group efforts and to overcome weaknesses learners have to be taught skills for participating effectively in group work" (**DDP7: Dataset**).

4.2.5 Group processing

According to the data this principle seems to rest more on the teacher than on learners evaluating their own members' work. Since the teacher is better learned and trained in child-behaviour, he/she will be able to see barriers to learning in some of the learners. For instance if:

> "you give them as a group to find out you can see as they move-on that from this group or this learner that knows what we are talking about because is busy helping and explaining, to others who don't have a clue, as you move around them, and that doesn't mean that by not responding because some learners they don't want to talk to communicate, instead they are good in writing. So even if they don't answer, it doesn't give you an over view that x there was only one learner who have answered, maybe it's tricky a question, all of them they don't

know, it's only this learner because some learners it's difficult for them to engage, to become active participants"(**FGP1: Dataset**).

The fact that you cannot rely on learners to do an absolute evaluation but rather on the teacher is evident in what SIP2 said:

> "the best way is to allow them to do exploration for as long I can hear what they are saying then I know they are on the right track, because when they do exploration I walk amongst the groups, so that I can pick-up what each group is doing. So, with my knowledge of the concept that I've involved in each and every discussion, I know that they are on the right track. Then I know how to help them, I pick it up that they got an understanding of one concept which may lead them to taking a route that is not correct... They do it there so that all of us can watch what is being done there, if there is a mistake they raise the hand and the person who is doing the calculation will stop for a while. Then we check if there is mistake or not, and then we continue if there is no mistake, but you have to find that, and then the calculation continues" (**SIP2: Dataset**).

SIP2 further explained why he cannot rely on learners to do the total evaluation because:

> "There can be elements of bullying if it is not closely watched...some learners in all that they are afraid of older boys in class or some learners should be afraid of girls who that are viewed as talking too much or talkative in a group, who will sometime turned to lead the thinking of others into a certain direction and kind of influence their thought process, influencing what they need to say. So, it can be a challenge in that, but I think the teacher needs to know exactly what needs to be done in that" (**SIP2: Dataset**).

It seems, otherwise, the learners will never take each other for real and this will result in endless quiries. Because of barriers to learning the group processing stage will always be incomplete due to various factors. For instance:

> "to sharing, you will find that the only people who are talking are those 'gifted' and 'mediocre'. Others you will find that others on the other-hand are improving ...the knowledge gap cannot be closed really, but you will find that, by mere presence of the 'gifted' there is something that they are gaining, you see. Not to mean that they must be exactly like the gifted, but putting them together is better than when it's the teacher telling them...Yes there can be weaknesses because you'll find that some of them are not participating here in the group is just in the group to gain knowledge, does not have any input to the group" (**HLP3: Dataset**).

According to GNP4 it seems that group processing is not the last thing to happen. It starts with the teachers planning and continues as the group work progresses. GNP4 gave a warning statement that:

> "if a teacher is not thoroughly prepared, has not prepared thoroughly it may end up with risk. A negative or an information that weren't expected...So it's very important to know and to know as well by practising self-evaluation and peer-evaluation... sometimes other learners assist to learn, they can dominate the group, and want to do everything on their own and the resources you will find that they don't want to share them. So, you should be always moving around the groups looking, and they working, as the work is going around them" (**GNP4: Dataset**).

SAP5 confirmed a similar view as GNP4 that:

> "The teacher must not take a back-seat, it must be also involve around those learners. It must check the maximum participation, are these learners all of them they are working together"**(GNP4: Dataset)**.

FGP6 confirmed this well that:

> "In order to monitor even the others that are gaining, in order to monitor that, you need to move around not just let them work as a group. And move around to try and pick-up the problems as they are going along, who is doing what, who is doing what and how? That needs time, but you need to try and make time"(**FGP6: Dataset**).

4.3 THE RESPONSES OF THE PARTICIPNTS ON COOPERATIVE LEARNING AS A TEACHING METHOD

It was seen in chapter 2 that cooperative learning involves certain essential elements or essential characteristics or principles. In this study participants were asked to indicate what cooperative learning practices they undertake. The responses were similar in the sense that participants indirectly, unanimously consented that cooperative learning is not a teaching method they use most. In the analysis of the data (refer to the dataset) the responses to this question centred around a theme named 'popularity of cooperative learning'.

4.3.1 Popularity of cooperative learning

Unlike the rest of the world where cooperative learning is popular, it turns out that cooperative learning is not popular among the participants.FGP1said that:

> "I (*means 'the'*) cooperative develop, *uzandilahla ngoku(means 'I'm getting 'lost' now; and the participant is ironically laughing)."*.... "*Ndiyayiqonda (means 'I know it')."*.... "That is why I'm saying, I said that, most of us you find out *intoba (means 'the reason that'*), they avoid (it) most of the time in their teaching" (**FGP1: Dataset**).

The reason to avoid it, according to the respondents, is that it requires a lot of planning and preparation by the teacher before coming to class. SIP2 said:

> "I don't always use groupwork, in data-handling and section that involves medians, and all the, thermometer and all that, and the time" (**SIP2: Dataset**).

It also takes a long time and a lot of effort from the learners to complete an activity. It seems HLP3 could not understand the words 'cooperative groupwork' nor distinguish 'cooperative groupwork' from just 'groupwork':

> "(*Whispering to the other teacher for an answer*) "*U* implement-*a intoni*?".... "*Kaloku uba (means: 'because you')* group-*a* according to *ii-* abilities *zabo (means: 'their abilities",* then *kengoku into oyenzayo ubanike mhlawumbi i* (means *'now, perhaps you give them an'*) activity, *mhlawumbi wenze i-* worksheet *ne (means: 'perhaps you do a worksheet')*, for *bona (means: 'them')*, then" (**HLP3: Dataset**).

GNP4 responded by saying:

> *"i* cooperative learning method I read about it and head about it, whilst I was doing BEd, Hounours, *uyabona?(*means *'you see')*.... But to me I've never use it more often, because, although *yona* (means *'it'*) is a very good *lanto (*means *'thing')*, teaching method, because everybody is involved *kwi (*means *'in')* learning. But I think, for *i* situation *yam (*means, *'my situation'), nendlela abantwana bam endibajonge ngayo (*means *'the way I see my kids')*, it needs learners who are very prepared to work" (**GNP4: Dataset**).

This participant's perspective of reasoning is no stranger to the 'ecology of learning' theory by Bronfenbrenner who looks at a child's development within the

context of the system of relationships that form his or her environment. Like Bronfenbrenner GNP4 argued that:

> "it's very difficult to implement *i* cooperative learning *kwi* situation *ezifana neyam, uyabona* (means 'like in my situation, you see?')... Most of *ii*-parents are literate, *kwi* Model C schools, they support their learners, everything....*i* support and the environment *asebenza kuyo*. Unlike *thina* from *i* poor socio-economic background" (**GNP4: Dataset**).

4.4 THE RESPONSES OF PARTICIPANTS ON THE CHARACTERISTICS OF COOPERATIVE LEARNING

The need for a cooperative learning approach, as stated in chapter 2, is its ability to cater for different needs in one lesson. On the question of implementation of cooperative learning in the classroom, my analysis highlighted these two themes: 'group composition' and 'roles of learners' in group work from the responses of the participants.

4.4.1 Group composition

Since cooperative learning has the ability to cater for different needs or abilities in one lesson, so participant HLP3 responded by saying:

> *"Kaloku uba* group-*a* according to *ii* abilities *zabo (means: 'Because you group them according to their abilities')"* (**HLP3: Dataset**).

As well, GNP4 defended the mixed groups of learners by saying:

> "...seating as a group, they think that it's groupwork. It's not group work, you're just seating as a group' (**GNP4: Dataset**).

In addition GNP4 with a compellingly response responded by saying:

> "You know there are higher-achievers, moderate-achievers and those that are, have slow-learners. I think it is also very important how you group them... *Uyaqonda*? (*means: do you understand?*) Take time, they are slow-learners. At least mix them, *uyeva*? (means: '*do you hear?')* High-achievers, moderate-achievers and through, within the same group so that they can assist each other,

you mix your groups, *uyaqonda ke*? (*means: 'you understand?)"* (**GNP4: Dataset**).

In addition FGP6 said:

"But as I have said before I group my learners according to their abilities mix the abilities, it doesn't have to be...The same, you group them according to their abilities, appointing leaders...." (**FGP6: Dataset**).

And DDP7 said:

"Weaker learners are distributed in various groups" (**DDP7: Dataset**).

4.4.2 Roles of learners in group work

In the literature review it is noted that teachers often confuse cooperative learning with group work. With regard to this, many responses pointed to the fact that the participants, though they were not aware of it, use forms of cooperative learning in which learners take on individual roles within the group, which Slavin (2014) calls 'task specialisation' methods. This method is suggested in the curriculum guidelines for inclusive teaching to overcome barriers to learning. It became a theme with regard to implementation of cooperative groupwork. FGP1 said:

"...they (learners) must know that there must be someone who is responsible for this, someone who is responsible for this, or also, even, someone who is writing the *ntoni?* (means: 'what?') the responses and now organising but all of them" (**FGP1: Dataset**).

SIP2 said that:

"There is going to be a group leader that will assign duties to all of them. They must cooperate with the leader to achieve the results of the group otherwise if they don't, they going to be delayed and they won't get them out" (**SIP2: Dataset**).

And HLP3 also said that:

"...at least *kufuneka kubekho i* group-leader *(means: 'there must be a group leader')*. *La* (*means: 'that'*) group-leader *izak'bayiyo ethi* (*means: is going be the one that'*) see to it *ubake le* (means: 'that this ') learning *bayenzayo iyaqhubekeka (means: that they are doing is happening)"* (**HLP3: Dataset**).

Also GNP4 said:

> "They are given task, whereby they have roles to play. After roles to play they work in groups, *ii*-tasks (*means: ii- is prefix for a plural word*) *zabo bezenza* (*means: 'doing their')* cooperatively, that is working together, whereby one would be a scribe, one would be a chairperson, but helping each other in the process of learning... learners need to understand their roles in this group work" (**GNP4: Dataset**).

In the literature review it is cited that the main purpose of the task specialisation used in Jigsaw method and group Investigation method is to create interdependence among the group members. It is clear from all the responses that the reluctance of teachers in using the cooperative learning approach underpins the fact that all learners need to play their roles in order for cooperative groupwork to be completed. Individuals' roles and responsibilities are important for finishing a task. As SIP2 mentioned:

> "They must cooperate with the leader to achieve the results of the group otherwise if they don't, they going to be delayed and they won't get them out" (**SIP2: Dataset**).

FGP6 said on individual responsibility:

> "The participation is maximum in group work."…. "It's maximum in groupwork because one has a role to play and knowing that I will get a mark because I've worked for it. In, I'm not going to get a mark because the group has done well. I'm going to get a mark that I've worked for and it brings about that sense of competing... but you need to consider individual participation, because some may leg knowing that we are going to get whatever the others are getting*, ne*? *(means: okay?)"* (**FGP6: Dataset**).

4.5 THE METHOD(S) THAT LEARNERS PREFER AND TEACHERS USE MOST

The responses to this question breakdown into two themes, the learners' preferences between a teacher-centred approach and a learner-centred approach, and the types of cooperative learning that the participants mostly use in their teaching.

4.5.1 Learners' preferred approach

This theme comes from the question of what approach learners enjoy, participate in and learn most, and it appeared that:

> "...it's a small portion of learners that enjoy the telling method"(**FGP1: Dataset**).

> "(*Laughing*) *Zona ke zi enjoya u* telling (means: 'they enjoy the telling method)" (**GNP4: Dataset**).

This is known as a teacher-centred *banking* concept of education where the teacher's task is to "fill" the learners with the contents of his or her narration. But the majority of responses pointed to a learner-centred approach. Learner-centred teaching approaches emphasise various forms of teaching strategies, one of which is cooperative learning.

SIP2 said:

> "I think they enjoy it because I could see when, I'm, I'm talking people might see that they relate to one another easily, they can talk freely in a group... They enjoy it because, mmm, sometimes they are scared of my big voice, and they are scared of certain characters such that, so they wouldn't want to do anything in-front of the whole class sometime" (**SIP2: Dataset**).

HLP3 said that:

> *"...umntana uyazenzela ngokunokwakhe uyaqonda (means: 'the learner works independently)*, unlike *apho ubuzabaniki* (*Means: 'where you would give'*.) groups, *uzabanika, uzenzela ngokwakhe (Means: where you would give, the learner work independently)*... *Eee-e*, they learn most, because *ufumani* (*Means: 'is getting*') information *apha kwi*-internet (means: 'in the'), *aphinde ayitshekitshe mhlawumbi kwi(Means: and research it again from a')* friend, author, *ayitshekitshe kwincwadi ukhubone*? *(Means: research it from the book, you see?), Aphinde afumane (Means: 'and get again')* i information *kwi (Means: 'from a')* friend, *alantuke (Means: 'and do')* i information (*A passing object taking the attention of the participant)"* (**HLP3: Dataset**).

Cooperative learning promotes interaction amongst learners, and provides the opportunity for learners to develop their social and communication skills. But its effectiveness amongst the slow-learners was questionable in the 'research review'.

SAP5 mentioned that:

> "... they'll be participating most on...because they are going to learn most, because they are learning in groups" (**SAP5: Dataset**).

FGP6 also confirmed that:

> "The participation is maximum in group work... because one has a role to play" (**FGP6: Dataset**).

4.5.2 Method-types of cooperative learning

'Discussion' is one of the most popular teaching methods compared to 'pairs', 'group projects', and 'jigsaws' used by the respondents to encourage cooperative learning during groupwork.

FGP1 mentioned that:

> "...by also giving group work or group discussion, it's now giving *i-* chance (*means: i* is a prefix for a singular word) now to the other learners because when learners they discuss something amongst themselves they've got *i* confidence because some they may fear even to be able to communicate with me. But now, when they are discussing among themselves, so you are also building in confidence on those learners who don't want to participate, and also you are building *i* confidence on those learners who already know" (**FGP1: Dataset**).

SIP2 also mentioned that:

> "The teaching method that I like most, are, discussion method... it can be the discussion method, aaah, where*, kaloku kukhwezi (means: 'because in these')* terms *zintsha (means: 'they are new'), (laughing)* the, where learners are able to, to bring, to, to, to bring their own problem solving skills... you can also use *i* group discussion where, for instance, even if you didn't put your learners

according to their academic *nto (means: 'thing'),* even as the ordinary group you can also use that" (**SIP2: Dataset**).

GNP4 also further mentioned that what he saw one time and it worked is that:

> "...you take one member from each group *bo* form-*isha (means: 'to form another group')* another group. *Ba, mhlambe, ba*: sort, *bathi mba kwi* group (*Means: if perhaps they sort of stick to the group*). So each and every member, comes up again to the original group *yakhe...* Ja, the jigsaw, ja, *uyabona? (means: you see?)* (*The interviewer knows it's Jigsaw method, he tells it to the participant and the participant is full of laughter and smile*) Then they come again to their original group. So each and everybody, has got to report to this group because each and everybody was in another group" (**GNP4: Dataset**).

Another form of cooperative practice that GNP4 mentioned is 'think-pair-share' even though he didn't mention it by name. He just suggested that you can have learners:

> *"Umhlawumbi noba kule (means: 'even if in this')* group *bayi (Means: 'they')* six, *ukhe uthi (means: 'you just say')* you two you will be working together, you two you will be working together, you two you will be working together, in this task, *uyaqonda ke?(means: 'do you understand?')* .... *Nina kule (means: 'you in this')* task your job is to do this, *nina kule* task your job is to do that, *nina (means: 'you')* is to do that, then you report to each other, at least after you have done your task, pairing them...." (**GNP4: Dataset**).

And:

> "Then *nenye ke (Means: 'and another')* sometime *endiyi sebenzisayo i-*discussion (*Means: 'that I use*'), especially *yona* not *is'kakhulu kwi* maths *(Means: 'the one, not mostly in maths)* , *ndiyayi titsha (Means: 'I also teach') ne* EMS*, i* discussion method whereby you need *ii*-input *zabo*, some sort of, *i* debating so (*Means: ii- is a prefix for a plural word inputs'*)" (**GNP4: Dataset**).

FGP6 told that:

> "we use different strategies as people, you might have your own way of doing it, I might have my own way of doing it. But as I have said before I group my learners according to their abilities mix the abilities, it doesn't have to be.... Most of the time *mna*it has to be a discussion thing (*Interruption, a teacher comes to open windows*)" (**FGP6: Dataset**).

It is clear from these responses that teachers use cooperative groupwork in a very limited manner in these six schools.

4.6 PRACTICES THAT PROMOTE POSITIVE ATTITUDES, SOCIAL SKILLS, AND MASTERY OF SUBJECT CONTENT

The responses to this theme are divided into two sub-themes, viz responses on the question of attitudes and skills; responses on how cooperative learning impacts on academic performance.

4.6.1 Responses on the question of attitudes and skills that learners gain during cooperative groups

In the context of cooperative learning as stated in chapter 2 it seems that teachers teach not only subject content, but also necessary social skills and dispositions. Learners learn to confront and negotiate with one another through peaceful means. Opportunities *or* 'benefits of cooperative learning' theme have been confirmed by many responses of participants. For instance FGP1 said, learners learn:

> "...the listening skill... And also the communication skills, for instance, because when someone is busy explaining or sharing the ideas to the other one, is also being able to *ntoni?* to communicate that so-and-so, *i* communication skills" (**FGP1: Dataset**).

FGP1 further stated that cooperative learning:

> "...may have *ii*- positive effects on the sense that, we, it's not only about the subject matter that is why I usually say to them, as an educator when they see me cutting to the cloud, they must not see me as a maths educator because at school there are various skills that are being *ntoni?* taught on them" (**FGP1: Dataset**).

And:

> "So that is why I say that the method although it's about the subject-matter but at the end of the day learners are gaining more and that indicated the communication skills, the confidence, the listening skill, the leadership skill, *i* respect, to be tolerant also towards others" (**FGP1: Dataset**).

SIP2 confirmed the acquisition of skills. It seems according to this participant that the skills are the tools necessary for mastering the subject matter:

> "The skills that they learn from working as a group they learn to respect one another, they learn to listen when another one is talking, they learn to be, they learn to be detailed ...to achieve the goal at the end of the task they need to have focused on all the details. That is, the, avoiding careless mistakes like, mmm, negative two multiply by three is equal to six. They know multiplication sign one, there's a negative sign, they know exactly what needs to be looked at, you see... also another skill that they learn out of a group what would be mathematics skills getting prepared... they should know up-front what is that they need to bring along, so that they can achieve what the aim to achieve" (**SIP2: Dataset**).

The skills they acquire also play a vital role during group interactions. For instance, according to HLP3:

> *"...then baya* communicate*-a, abanye bayayimamela (means: 'others they listen'), i* listening skills. *Baphinde ba* communicate *ngela xesha ubanik'i(means: 'during that time')* problem or *nala (means: 'and that')* interpersonal skills baya, (*means: 'they'*) skills?" (**HLP3: Dataset**).

And GNP4 responded by mentioning respect which goes a long way especially for healthy group interactions, like:

> "...listening to other people, different perspectives, handling different perspectives of issues, respecting other people's ideas... learning *ii*-skills whereby abany'abantu they are developing *ii*- skills of reporting, *ii*-skills of being a scribe, ii skills of chairing group, of doing task, you see... So, those skills, those are the skills that they are learning, because the *task abanazo ziya* rotate, *azihlali ndawun'inye (means: 'the tasks they have rotate, they keep on changing)*" (**GNP4: Dataset**).

Every group member seems to stand the same chances to benefit from rotating the roles, like gaining:

> "Interpersonal skills, communication skills, self esteem, ability to substantiate their own views, and social leadership" (**SAP5: Dataset**).

Even those learners classified as 'needy' when exposed to cooperative learning opportunities of learning their behaviour stands a chance of changing to a positive one. FGP6 said:

> "it make those who are shy to try and tell the story at least *ubani (means: 'somebody')* is doing it like this well let's try *nam (means: 'and myself')* i-change (*The interviewer laughing ironically*)...Because *ubani* is good for, is speaking out loud and clarifying the point, so, why can't I... also it promotes *ii*-social skills (*means: ii- is a prefix for a plural word)* because by interacting with different people from different perspectives it gives them that insight of care, how to deal with different people" (**FGP6: Dataset**).

This theme of benefits as 'equal opportunities' to participate and learn opens a window of opportunity to impact not only on promoting positive attitudes and gaining of skills, but also on learners' academic performance.

4.6.2 Responses on how cooperative learning impacts on academic performance

According to my analysis of these responses there is an abundance of achievements that cooperative learning brings to learners. These responses centre around the finding that cooperative learning 'enhances learning'.

Participant FGP1:

> "If they have *i* homework for, they been given *i* homework, they take turns... if I am not here, they've been given *i* homework, he knows that he's got to be infront, first of all to tell that the maths period has started... he goes into the board he divides the board and writes the date for himself, correction and it becomes*, ibe yintoba (means: 'be that')*, we are going to do *ii*-corrections... they answers the question, they do that as *i* rules. You don't ask *ngoba ngokuthi (means: 'because by doing')* simply hands-up, simply put up" (**FGP1: Dataset**).

In a learner-centred activity it can be deduced from participant SIP2 that cooperative learning:

> "...has a very positive impact because if one learner gets a correct answer and they agree, the competence develops in that learner... say we are talking addition of fractions, mmm, one person, I can start back at loaf of bread and the

whole and divide it into halves and quarters, eighths because during lunch-time hence are they to divide the quarter they know.... They know a loaf of bread that it's whole, they know the quarter, they know the eighth and the half. So, they bring all those in quarters they make it a whole, how is it made a whole, mmm, for quarters make-up a whole or eighths and all that... So, that is how they turned to share knowledge about equivalent fractions for an example. So they will know exactly that what is an eighth of an eighth will give you in one quarter" (**SIP2: Dataset**).

Positive effects were noticed by HLP3 who also teaches grade 12:

> *"Ne* pass rate *ufumanisek'uba i* high *ngoku (means: 'You'll find out that'), ufumanisek'ukuba bebe* fail-*a kuqala (means: 'they were failing at first)*, the more *besenza ii-* problems...*ubanika another (means: 'you give them') eza (means: 'those')* discussion *zabo, neza* (means: 'and that') sharing *zabo yonke la(means: 'all their')* activity *ngelahlobo umana ubanika zona ufumanise ukuba baya* improve *(means: 'that you give them, you will find that they are improving')*. Like *jonga* for instance sine camp, *phakula* camp, *ababantwana bahlala pha, batya pha, bafunda pha, niyaba titsha pha*, but *ubakhona ilantuka umehluko pha*, rating yabantwana*, bapasile almost bonke, abangapasanga babethi* supp *qha, sendisitshuba lanto yoku* share-*ishabahlale kunye* one *ndawo bangabi pha babelapha*, *ingqondo zabo neza* study methods, *okanye yonke lanto leya iyabanceda, uyaqonda... amane*'improve-*a uyaqonda, mhlawumbi kwi algebra uya* improve-*a, ufumanis'ukuba*, ooh *pha kwi* geometry *noko uyazama kancinci (*means: 'Like, see for instance we have a camp, learners stay there, eat there, learn there, we teach them there, but there's difference, passing rate for almost all the learners, those who did not make it are writing supp only, I mean the sharing and staying as a group instead of roaming around and save their brains from damnation through study methods, or all that is happening here helps them, do you understand...but gradually improving, do you understand, perhaps in algebra is improving, and find in geometry is improving a little bit)" (**HLP3: Dataset**).

GNP4 said that cooperative learning:

> "...enhances the academic knowledge of learners, uyabona? (*meaning*: you see?). If, and everybody work and everybody mhlawumbi (*meaning*: perhaps) impart as a group member, then i academic performance yabo iyenyuka (*means*: is improving)" (**GNP4: Dataset**).

The learner who teaches other learners actually re-inforces his/her own knowledge which thus results long term retention of knowledge. This is confirmed by participant SAP5:

> "They hardly forget what they teach each other" (**SAP5: Dataset**).

FGP6 explains it by saying:

> "You have this packet of *ii*-Smarties for instance you are using it he you calculate the ratio ne? from these packet of Smarties One might want to say what is this ratio, but *ke ngoku na ke* with them they will be able to tell each other that, this packet of Smarties contains about fifty four *ne*? Then, if you have ten yellow eight whatever colour, then what will be the ratio of yellow Smarties in the packet, do you get me" (**FGP6: Dataset**).

4.7 CONCLUSION

In analysing the teachers' practices of cooperative learning instructional techniques in the six selected schools, the data presented revealed a variety of teaching strategies that mathematics teachers use to promote the mastery of subject content. The teachers' practices of cooperative learning were not wholly consistent with the cooperative learning principles as outlined in the NCS (2012) policy document and Slavin's (2014) key practices of cooperative learning. The teachers' instruction and learning paradigms were not learner centred; most teachers preferred teacher-centred instructional techniques which are not consistent with cooperative learning in the learner-centred paradigm. Cooperative learning had no benefits for learner performance because of the use of teacher-centred techniques.

The next chapter discusses findings that emerged from the study and their implications for further practice and research.

CHAPTER 5
DISCUSSION OF FINDINGS

5.0 INTRODUCTION

This chapter discusses the main findings of the study. The discussion is organised into three main themes: consistency of mathematics teachers' practices with regard to cooperative learning instructional techniques; teachers' teaching and learning paradigms; and cooperative learning and teachers' instructional practices and their implications for learner achievement.

5.1 CONSISTENCY OF MATHEMATICS TEACHERS' PRACTICES WITH COOPERATIVE LEARNING INSTRUCTIONAL TECHNIQUE

Taking the re-packaged NCS (2012) it can be expected that mathematics teachers' practices do not contradict those that are in the official policy documents or are outlined in the theory of cooperative learning instructional technique. In other words, this study expected to observe consistency between teachers' practices and the principles of cooperative learning. It was argued, following Johnson and Johnson's (2009; 2014) five essential elements of cooperative learning,and Kagan's (2014) PIES acronym for four basic principles of cooperative learning (viz. *positive interdependence; individual accountability; equal participation*; and *simultaneous interaction*), and Slavin's (2014) five key practices of cooperative learning instructional techniques; and this study sought to find out whether teachers' practices were consistent with them (c.f. chapter 2). More recently one of the exponents of cooperative learning outlined principles which correspond to Johnson and Johnson's (2009; 2014) essential elements and Kagan's (2014) basic principles and those in the NCS (2012) viz. *positive interdependence, individual accountability, social skills, face-to-face interaction*, and *group processing*.

Then, since we have talked of consistency of principles and practices, Slavin (2014) has done the job because he says what these practices are which

correspond to these principles in Johnson and Johnson (2009; 2013), Kagan (2009 & 2014), and in the NCS (2012). These practices are outlined below:

5.1.1 Form interdependent teams

Under the literature review focused on this practice, this study came up with two sub-findings. One, the practice of forming interdependent teams as outlined by Slavin (2014:23) corresponds with Johnson and Johnson's (2009; 2014) first essential element of positive interdependence and Kagan's (2009 & 2014) first basic principle of positive interdependence. This practice also corresponds with NCS's (2012) first essential element of cooperative learning. By positive interdependence Johnson and Johnson meant setting the mutual goal of interdependence; while Kagan meant producing the desired social outcomes such as sharing, caring, helping, and empathy; while in the NCS it meant that the accomplishment of a group goal should depend on all group members (c.f. chapter 2). Two, this study found that Slavin (2014), Johnson and Johnson (2009), Spencer Kagan (2009), and the NCS (2012) all make the principle of *positive interdependence* the first principle.

In the gathered data under this practice two sources of information, interviews and observations were analysed (c.f. chapter 4). The teachers' practices of *positive interdependence* were found to be consistent with this principle. All the seven interviewed teachers' responses confirmed that they placed learners into groups and give them roles. These teachers told me how they structured these small learning groups, which is by putting them in a face-to-face seating arrangement and dividing the task among group members. The division of the task through roles to play and mixed abilities created an element of interdependence among group members. In the observations from four out of the seven schools observed, teachers placed learners into physical groups in which positive interdependence showed itself through the division of tasks and the roles played when learners were taking turns to talk; at the same time others were listening and others were writing down important points.

However, in this sub-section the teachers' practice of *positive interdependence* in these schools was consistency to a certain extent. On the one hand there is consistency to the principle of positive interdependence as described by Kagan (2014), Johnson and Johnson (2009, 2013 & 2014), and the NCS (2012). On the other hand, there is some-how a mispresentation and misrepresentation of what is meant by mixing learners according to their abilities. Teachers seem to think that the group leader must always be the ones who are high achievers. One participant teacher told why he does not use group work always. He said some learners do not want to cooperate because they think that group work is for teachers who are lazy, who shift their teaching role by choosing either his or her favourite learners to teach others or let learners choose each other. This is when low achievers would participate less and less and thus create a hierarchy of roles among the groups instead of equal participation.

5.1.2 Set group goals

Another cooperative learning practice for Slavin (2014) is that of 'set group goals'. Under this practice, this study came up with three findings. One, recently it has been found that although experts such as Johnson and Johnson (2009, 2013 & 2014), Slavin (2014), and Spencer Kagan (2009 & 2014) have led cooperative learning around the globe, they differ on some points (Kristjana, 2014). Two, Slavin's (2014:23) practice of setting group goals corresponds indirectly with the principle of positive interdependence. How these two correspond is stated in Johnson and Johnson (2009) that the ways of structuring interdependence may be subsumed into three categories: *outcome*, *means*, and *boundary* interdependence. Outcome interdependence includes goals and rewards. Thus the practice of setting group goals indirectly corresponds with the principle of positive interdependence. Three, to Johnson and Johnson (2009, 2013 & 2014), Kagan (2009 & 2014), and the NCS (2012) setting of group goals corresponds to positive interdependence. Slavin (2014) is the only one who has it as a stand-alone principle or key practice.

In the data under this practice of setting group goals, interviews and observations as sources of data were analysed (c.f. chapter 4). One, this study

found that six out of seven interviewed teachers revealed that mutual goal interdependence increases learner participation during a learning activity. The interviewed teachers said that when learners are together working in a group towards a mutual goal, even those shy and slow learners become active participants than they would talk to them in front of the whole class. Two, in the observed lessons learning seemed increased compared with whole class teaching. Although Slavin (2014) said that learners will do more if they share a team goal, in all the observed lessons this study did not find evidence that learners were clear about the goals right from the start. The observed teachers' practice of setting group goals was towards the middle of the teacher-centred and learner-centred practices by Slavin (2014), Kagan (2014), Johnson and Johnson (2009, 2013 & 2014) and in the NCS (2012).

5.1.3 Ensure individual accountability

The practice of ensuring individual accountability by Slavin (2014) corresponds to Johnson and Johnson's (2009, 2013 & 2014) second essential element of individual accountability and personal responsibility, with Kagan's (2014) second basic principle of individual accountability, and also with the NCS's (2012) second essential element of cooperative learning (c.f. chapter2). In the literature this study found that, according to Johnson and Johnson (2009), Kagan (2014), and NCS (2012) individual accountability came as a second principle whilst in practice, according to Slavin (2014), it's the third.

From the literature Johnson and Johnson (2009:367) clearly stated that interdependence includes resources, roles, and task interdependence. In fact individual accountability comes from positive interdependence, not vice versa, thus making it second to positive interdependence. Another finding in principle, NCS (2012), Johnson and Johnson (2014), and Kagan (2014) gives us a synopsis of the two principles (positive interdependence and individual accountability) as necessary for cooperative learning but not sufficient. Evidence of this practice was observed in this study. In four out of six schools when learners divided tasks and resources through roles to play, that was putting responsibility and accountability on group members. This practice by the

mathematics teachers in this study found it to be consistently not close to this practice by Slavin (2014).

In this sub-section there is no evidence that the performance of each individual member was assessed and the results were given back to the individual and the group to compare against a standard of performance. The reason for this, its may be because the group goals were not even stated right from the beginning since group goals and individual accountability are intertwined.

5.1.4 Teach communication and problem-solving

The practice of communication and problem-solving by Slavin (2014) corresponds to Johnson and Johnson's (2009) appropriate use of social skills, which also corresponds to the NCS's (2012) interpersonal and social skills, which also corresponds to Kagan's (2009 & 2014) positive interdependence with regard to a common goal (desired social outcomes such as "sharing, caring, verbal skills, and listening skills"). Since communication and problem-solving are skills, this practice by Slavin (2014) in this study was found to be consistent with these three principles. Recently, in the literature new studies on the effects of cooperative learning have consistently indicated that this method improves learners' oral skills and writing. This finding on this practice suggests that the effectiveness of cooperative learning rests on the mastering of content or skills.

From the data, six out of seven interviewed teachers confirmed that teaching learners social and interpersonal skills has positive effects on cooperation amongst the low ability learners. It has benefits of improving competence and interaction with others, particularly for learners who are shy to speak to the teacher in the presence of the whole class. They open-up when they talk to their teammates (c.f. chapter 4). However, in this sub-section this study did not find evidence that learners, through observation, were presented with meaningful and interesting mathematical problems that could not be completed by an individual as defined in the NCS 2012 Teachers' Resource Pack. What learners were doing was that there will be those who will finish early and then attempt to help the late finishers.

5.1.5 Integrate cooperative learning with other structures

According to Slavin (2014:25) cooperative learning should be seen as a key part of each lesson, but not the whole lesson. Effective class lessons might also include teacher instruction, media- or computer-based activities, and individual assessments of various kinds. In this study it is found that this practice by Slavin (2014) of integrating cooperative learning with other structures corresponds to the NCS (2012). Cooperative learning can be integrated with other mathematics teaching-learning approaches. This practice of integrating cooperative learning with other structures also corresponds with Johnson and Johnson's (2014) opinion of using technology to revolutionise cooperative learning. Groups can meet either face-to-face or online. However, Johnson and Johnson (2014) argued that there is considerable evidence that in cooperative endeavours, face-to-face interactions are more effective than an online interaction. Use of technology was also mentioned in the NCS's (2005 & 2010) characteristics of face-to-face interaction where it is stated that the modes of interaction are not limited to face-to-face interaction and may include computer-media technology.

In the interviews there is evidence that teachers integrate cooperative learning, though poorly, with other instructional techniques like rote learning, telling method, question-and-answer, discussion, discovery learning, and problem-solving. In all the observed lessons when learners seem to be losing a sense of what they are supposed to do the teacher would one way or another be required to play a role whether to do or say something. In this sub-section this practice in the researched schools was consistently not far from Slavin's (2014).

In conclusion about the whole practice, teachers' practices of 'cooperative learning' instructional techniques in these six schools were consistent to a certain extent regarding all five elements. Whether the teachers' practices were *far*, *median*, or *close*ly consistent to those outlined by Slavin (2014) is summarised here as follows: on four practices, *forming interdependent teams*; *setting group goals; ensuring individual accountability;* and *teaching*

communication and problem-solving skills was median but close on how to *integrate cooperative learning with other structures.*

5.2 COOPERATIVE LEARNING INSTRUCTIONAL TECHNIQUES AND TEACHERS' TEACHING AND LEARNING PARADIGMS

In chapter 2 it was argued that cooperative learning is consistent with certain teaching and learning paradigms. On the one hand there is the instructional paradigm and on the other hand there is the learning paradigm. On the instruction paradigm you have the teacher-centred approach and on the learning paradigm you have the learner-centred approach. Then, when the teacher was in the classroom he or she was not giving instruction but producing learning. Now production of learning is controlled by learners in the learning paradigm. Cooperative learning is a strong technique in learning paradigm because it is not so much even an instruction technique which is meant for learners to learn but learner interactions. Those learners in the cooperative learning paradigm must be quite different from those in the teacher-centred paradigm. So, in-between the two paradigms there might be a variety of other orientations such as a mix of paradigms more teacher-centredness and little learner-centredness or little teacher-centredness and more learner-centredness.

5.2.1 Instruction paradigm

In the literature it was argued that in the instruction paradigm we have a teacher-centred approach. According to Kristjana (2014:21) the instruction paradigm is consistent with John Locke's (1692) theory of *tabula rasa*, that is, the learner's mind is like an empty piece of paper, waiting to be written on by the teacher. In other words, knowledge is transmitted from the teacher to the learner. Paulo Freire (1972) would say learners become passive vessels for *banking* to be filled by the teacher's deposits of knowledge which they must patiently receive, memorise, and repeat (c.f. chapter 1).

In this study there is evidence that in the researched schools teachers' instructional techniques are found to be most time in the instruction paradigm.

The instructional techniques are in their teaching repertoire. Six out of the seven interviewed teachers like methods that are teacher-centred (c.f. chapter 4). The six teachers who like teacher-centred methods like more than one instructional techniques three like the telling method, four like problem-solving (*without* fostering group work) and two like the question-and-answer method. When teachers switch to this paradigm, during the learning activity teachers seem to do most of the talking by `transmitting knowledge and acting as the only source of knowledge'. With regard to content, teacher-centredness was seen by many researchers as oppressive. Teacher-centredness does not give learners the autonomy to democratically think for themselves, instead it undermines them. According to this evidence this study found that production of learning was controlled by the teacher. Cooperative learning was not a strong technique of learning. In this sub-section the teachers' practices of cooperative learning, in the continuum, from instruction to learning paradigm, were found to be consistently far from the learning paradigm.

In this sub-section this study found that the teachers' cooperative learning practices were not consistent with the learning paradigm. In the teacher-centred paradigm, learners have little control over their learning. Production of learning and content of the subject is more strongly controlled by the teacher. The role of a teacher tends to be more overt. He or she has a lot more control over the selection, sequence, and pace of learning (Hoadley and Jansen, 2009:177; NCS, 2012). While in the learning paradigm (discussed in the section below) it is just the opposite.

5.2.2 Learning paradigm

In chapter 2 it was argued that with the learning paradigm we have the learner-centred approach. Recently in the literature review it's been mentioned again that teaching and learning paradigms using cooperative learning techniques are learner-centred paradigms which have gained popularity as an alternative to the instruction paradigm (Al-Tamimi and Attamimi, 2014:30). In South Africa learner-centredness gained prominence after the attainment of democracy and has been

associated with education for liberation. According to Al-Tamimi and Attamimi (2014) the role of teacher in the learner-centred cooperative learning method shifts from being a transmitter of knowledge to becoming mediators of learning. In other words, learning is an interactive process between learners and the teacher, with the learners at the centre of the process (c.f. chapter 1).

Cooperative learning differs from other instructional techniques because of its benefits resulting from social interaction between learners (Al-Tamimi and Attamimi, 2014:29). Two out four observations respectively correspond to the principles of *social skills* in NCS (2012) and to *interpersonal & social skills* in Johnson and Johnson (2009). To Slavin (2014) interpersonal and social skills correspond to the practice of teaching learners *communication and problem-solving skills*. In one school I got the opportunity to do the observation of learning in context through card games using *Maths 24* (c.f. SAP5, *Dataset*). I observed that when learners were talking face-to-face they were freely expressing themselves compared with when the teacher transmits knowledge because teachers seem to do most of the talking and act as the only source of knowledge. The production of learning and communication skills development is a stronger technique in the learning paradigm than in the teacher-centred approaches. In the learner-centred paradigm teachers played the assessor's role of assessing the correct use of mathematical terms in verbal communication and spelling and writing. A learner-centred instructional approaches afford a chance for learners to express themselves using the language of mathematics and provide equal opportunity to contribute to the success of the group.

In one of the four observations I observed cooperation in context. When learners were doing calculations there were those problems that could not be solved using routine or drilled responses. Learners struggled in search of 'mathematically valid' methods of calculation. The teacher was called to decide the correct method in solving the problem. All learners were actively involved in the learning activity. Hoadley and Jansen (2009:175) argued that cooperations that learners already have are sought on the inside; cooperations are believed to be innate, thus knowledge is not sought from the outside. The teacher brought different containers of millilitres and litres, grams and kilograms to do the

conversion of one unit to another for them to take turns to do the conversion of units of measurement (c.f. SIP2, *Dataset*).

In this sub-section this study found that cooperative learning is consistent with the learning paradigm. According to Hoadley and Jansen (2009:175) learners have control over the selection, sequence, and pacing of their learning. The teacher's role is covert. Rather than directly transmitting learning, the teacher acts as a guide and facilitator.

5.2.3 Instruction and learning paradigm continuum range

In chapter 2 it was argued that inbetween the instruction and learning paradigms there are no strong boundaries. There is a variety of other teaching and learning orientations because it is a continuum, ranging from least learner centred (i.e. learners totally passive recipients of knowledge) to most learner centred (i.e. learners fully active and responsible for own learning). A paradigm shift corresponds to Slavin's (2014:25) practice of integrating cooperative learning with other structures that cooperative learning should be seen as a key part of each lesson, but not the whole lesson. Effective class lessons might also include teacher instruction and individual assessments of various kinds.

In this study it was observed that in one school learners in their groups were required to solve some problems. The teacher introduced the topic in the workbook on probability and taught the learners to understand the content following a whole-class approach. The teachers taught the content directly and for most of the lesson time, with learners working individually, and with only a few times when the learners in groups asked for answers from each other. Some learners were contributing towards the answer, some contributed a little in group performance. They were working together in groups without individual accountability. This produced two opposite outcomes of cooperation called *free-rider* and *know-it-all* by Slavin (2014) (c.f. FGP1, *Database*).

In this sub-section this study found that the teacher's practice was not consistent with the principles of cooperative learning. The teacher was in control of lesson content, pace and sequence, and was the main source of information without

individual accountability. This teacher's teaching and learning approach showed little learner-centred orientation; just group work with no individual accountability. Learners were not fully active and responsible for their own learning nor totally passive as in the purely teacher-centred paradigm. In this whole section this study concludes by saying that cooperative learning was not consistent with the teacher instructional techniques, and group work was consistent with the learner-centred approaches and not with cooperative learning.

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5.3 TEACHERS' INSTRUCTIONAL PRACTICES AND THEIR IMPLICATIONS FOR LEARNER ACHIEVEMENT

In chapter 2 there is this argument that learners who are exposed to the instructional paradigms of teaching and learning will not out-compete those in the learning paradigms. In the cooperative learning paradigm achievement is defined by this study in terms of improvement. At a lower level it may not be that simple to understand, for instance, failing a test does not mean that there is no achievement. Let's say, for instance, today I score 20 percent and fail the test and next week I score 25 percent. I am still failing but I have achieved. There is improvement and there is achievement. Learners in the learning paradigm will say this is learning but the teacher in the instruction paradigm will say no I must teach them more maths. They did not follow my instructions. Because the teacher controls lesson content, pace, and sequence, each bit of knowledge becomes more complex than the previous bit of knowledge.

The content- and teacher-centred approaches correspond to NCS (2012). In the NCS (2012) the specified content - the pacing, sequencing and coverage of content - is provided and the requirements for progression and promotion, i.e. conceptual development from one grade to another is also clearly indicated. In the findings, the interviewed participants confirmed that they observed improvement in terms of achievement for low-achievers. Low achievers when put in cooperative learning situations play an active role in group goal sharing and their attitudes become positive ones. This finding about cooperative learning approach also corresponds to Slavin's (2014)'s integration of cooperative

learning with other structures which states that cooperative learning should be seen as a key part of each lesson, but not the whole lesson.

Looking through the data this study found that most of what the teachers were doing in the instruction paradigm was not giving learners the autonomy and that undermined them, their achievement, and the learning paradigm. In the instruction (i.e. *banking*) paradigm, progress on learner performance is based on the evaluation of gains and losses. The losses must not be more than the gains to be called an achievement.

5.4 CONCLUSION

The four main findings of this study have been discussed in detail, namely: the consistency of mathematics teachers' practices with cooperative learning instructional techniques; cooperative learning instructional techniques and teachers' teaching and learning paradigms; teachers' instructional practices and teachers' practices of cooperative learning seem to fluctuate between the instructional and learning paradigm. They disagree as to what promotes the mastery of mathematics subject content. However, this chapter concluded by saying that even if it is a lower level, improvement from level 1 to level 2 is an achievement to the learner in the learning paradigm; what teachers were doing in the instruction paradigm was not giving learners the autonomy and that undermined them and their achievement because they evaluated performance in terms of what was missing instead of gains and achievement.

CHAPTER 6

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.0 INTRODUCTION

This chapter presents the summary of the main ideas of the study and the main research findings. It describes the potential contribution of the study and it ends up by giving recommendations for further research and for future practice of cooperative instructional techniques by teachers.

6.1 SUMMARY OF MAIN IDEAS OF THE STUDY

In chapter 1 this study gave the background of the cooperative learning instructional techniques in the Republic of South Africa and other countries of the world with special reference to mathematics teachers' practices of cooperative learning instructional technique in six schools in the District of East London. These teachers' distribution by years of experience ranged from less than five years to more than twenty years. Two main sets of issues and debates in understanding cooperative learning followed, debates of benefits, and its need as a mathematics instructional technique. Then the implications of poor learner performance as motivation for the study, and the problem of teachers' delivery of the subject matter (both addressed by research and sub-research questions) were laid-down. The purpose and significance of this study, definition of terms, literature review and research methodology were also given here, accompanied by research quality and approved ethical consideration.

Outlined in chapter 2 are the key conceptual ideas which are central to this study such as the ideas of Johnson and Johnson (2009), Spencer Kagan (2014), NCS (2012), and Slavin (2014). Studies conducted on cooperative learning in the countries of Malaysia, Pakistan, Singapore, Taiwan, Hong Kong, Cortland (USA), Nigeria, and South Africa were used as illustrative material. Then followed the

theoretical framework insights and the research informing this instructional technique, such as group work and cooperative learning, ecological systems and opportunities to learn in cooperative learning, ecological systems studies conducted abroad and cooperative learning in America and Canada. This chapter rounded off by showing understanding of theories and philosophies underpinning this instructional technique in South African policy documents.

Chapter 3 started with the idea of research orientation which is a qualitative method - interpretive research approach design. Purposive selection of cases and detailed description of each case and fieldwork were explained which was followed by qualitative methods of data collection with special reference to interviews and observations as the main data gathering instruments, together with other techniques such as documents and archival records, and field notes analysis. Then followed a discussion around issues of trustworthiness such as credibility, dependability, conformity, and transferability. The chapter ended by giving ethical measures taken in gaining entry into the field.

Chapter 4 began with the presentation of data analysis with arising themes. This was presented in the form of tables. Five themes were analysed drawn from the full dataset which is given in the appendix. All in all, five main themes stemmed from the data and were interpreted by reference to conceptual and theoretical ideas discussed in chapter 2.

Chapter 5 started with the discussion of the main findings organised into three main themes. These included issues and debates concerning consistency of mathematics teachers' practices with cooperative learning instructional techniques followed by issues and debates on cooperative learning instructional techniques and teachers' teaching and learning paradigms, followed by teachers' cooperative instructional practices and their implications for learner achievement in mathematics.

Chapter 6 finally gives the summary of the main ideas in chapters 1-6, the potential contribution of the study, and the recommendations for future practice and research.

6.2 SUMMARY OF RESEARCH FINDINGS

The main findings are divided into five main themes and these are given below.

6.2.1. Some consistency was observed between the practices of cooperative learning instructional techniques and concepts outlined in the NCS (2012).

Through the data some consistency was observed on how participants implement cooperative learning structures as outlined in the NCS (2012). It seems that they group learners and give them different roles to play such as group leader, scribe, reporter, calculator, etc. The leader is responsible for maintaining order, discipline, and rotating play-roles in the group. She or he encourages group members to learn and makes sure that they are learning and well behaved. These structures were, however, hierarchical, and produced two types of learners, the 'free rider' and 'know-it-all' learners. The leader is the 'know-it-all' kind of learner at the top and the 'free rider' is at the bottom. By this it means they confuse cooperative learning with groupwork.

The division of labour and the learning material among group members vary according to the level of intelligence from the leader at the top to the least role played by slow learners in the group. It seems, according to Slavin (2014), that the principle of equality is not applied when they use a 'random reporter' type of cooperative learning structure. In my understanding 'random reporter' means that all team members stand an equal chance of being a reporter unlike in the hierarchical structure (ibid). To Slavin (2014), for example, if there are five members in the group, the teacher gives each member a number. When the teacher asks a question, she or he directs it to a team and then picks a number at random. This requires that all group members must master the targeted content and skills. Unlike in the 'free rider' and 'know-it-all' situation all group members are given the same topic with different roles to play but each learner in the group is given one part of the topic to learn (according to his level, interest, etc.), thus becoming an 'expert'.

6.2.2 Mathematics teachers in these schools used a variety of teaching approaches to promote the mastery of the subject content

Inspite the fact that most participants confuse cooperative learning with group work, all the participants interviewed were not confident of their ability to use cooperative learning as a teaching method. When an activity requires teachers to use cooperative learning, they use a variety of teaching strategies in promoting the mastery of the subject content (see chapter 4). It followed that the levels of practice of cooperative learning in these schools seemed not to be increasing since its inception in the curriculum as an instructional technique. The banking concept of teaching from the traditional approach seemed to be the dominant method that worked best for these teachers rather than a learner-centred approach. Their concern was that it is easy to quickly pick up a mistake, off-task behaviour such as loafing, bullying, etc. In group work they think that 'cooperative learning' is problematic for assessing individual effort from group work since all the members of the group rely on the fact that they will get the same mark in the end. They did not see cooperative learning as being able to address the gap of poor mathematics learners' performance.

6.2.3 Cooperative learning as an instructional technique did not appear to be a dominant approach to teaching

The participants used cooperative groupwork in a very limited manner in these six schools. Amongst their many reasons for not liking to use cooperative learning is poor learning outcomes; it is time consuming; it demands a lot of preparation from the teachers. They do admit, however, and also through my observations, that learners enjoy a learner-centred approach such as group work. In record analysis it seemed that cooperative learning in these schools has no strong implications for learners to benefit according to the mathematics performance results. By observing learners in action and doing an analysis of the ANA documents at district and national level, they exhibited poor mathematics passing levels.

Among the teaching issues that affect quality teaching is how teachers deal with the delivery of subject content, and how they deal with attitudes to the subject. The participants showed appreciation of learners learning academic skills (e.g. communication skills, listening skills, interpersonal skills, etc.) during cooperative group work but they were not aware that cooperative learning is a peculiar instructional technique which aids teachers in teaching subject content and social skills and dispositions to learning. They thought that since learning outcomes in the NCS (2012) prescribed content, under cooperative learning you might end up not getting or achieving the aims and objectives of your lesson or finishing it or learners could gather the wrong information. They felt there are some learners who needed their individual space because they could not work best in a group. Otherwise, cooperative learning needs learners and teachers who are prepared to work hard for it to succeed.

6.2.4 Challenges experienced by some teachers in setting up cooperative learning structures in the classroom

During analysing the interviews of mathematics teachers, the participants did not explicitly describe all the elements of cooperative learning which would benefit all group members to improve their achievement in mathematics. Utilisation of all its elements is crucial to make a cooperative learning lesson a success. Their 'cooperative learning practices' do not speak to what cooperative learning seems to address, a gap in addressing underperformance in mathematics. Some of the key elements that distinguish cooperative learning from just group work were missing. Unlike the rest of the world where cooperative learning is popular, it turns out that cooperative learning is not popular among the participants. It is not the method that the participants like most and they often confused cooperative learning with group work.

Kagan (2009) discussed the benefits of why cooperative learning is an alternative approach to classroom organisation. The participants complained of the problem of not being able to keep all learners actively engaged. They complained of learners who did not participate, while some were too talkative or bully. According to my analysis the problem lies at the heart of implementing

cooperative learning structures. The participants also complained of learners not reaching a mastery level of the subject content. It seems by allowing the 'know-it-all' to be leaders and slow learners to be 'free-riders' has implications for poor learning outcomes and off-task behaviour. Learners are assigned tasks of varied levels of difficulty, thus specialise in their roles and end up spending most of the time interacting with the learning material instead of equal distribution of cognition to each other by doing the task together, step-by-step as in a 'random reporter' where all members stand an equal chance to learn and master the targeted content and skills.

6.3 POTENTIAL CONTRIBUTION OF THE STUDY

Even though this study was limited to six schools it revealed that teachers' practices of the cooperative learning instructional technique were not demonstrable under observation. According to principles of cooperative learning instructional practices, there is a need for teachers to understand an all-inclusive approach as defined in the NCS (2012) policy document in order for it to be a success. By focusing on teachers' practices of the cooperative learning instructional technique, this study seeks to empower teachers for whom this teaching-learning approach is intended.

6.4 CONCLUSION

It can be concluded that in these selected schools teachers' practices of cooperative instructional techniques are unlikely to improve learners' achievements as long as teachers still do not know what it takes to make cooperative learning a success. Another conclusion is that the poor learners' performances in terms of subject content will not improve as long as learners are not well taught how to work in a cooperative group before they reach the mastery of the subject content.

6.5 RECOMMENDATIONS

Two sets of recommendations are suggested: one for further research and the other for further practices of cooperative learning instructional technique.

6.5.1 For further research

Given the research findings above, it is recommended that the teachers' practices of the cooperative learning instructional techniques be the focus of a quasi-experiment research for which a pre-test and a post-test experiment on learners' performance can be compared to determine its effectiveness.

6.5.2 For further practice

For future practice of the cooperative learning instructional technique it is recommended that the challenges faced by teachers in these six schools be facilitated by the Department of Education through teacher empowerment programmes in order to come to a common understanding of this teaching-learning approach. On the quantitative side of the research, an inferential deductive reasoning can be made that if these teachers could mostly learn to like cooperative learning as their teaching method, this could contribute to the improvement of achievement in mathematics.

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APPENDICES

7.1 Appendix 1: Participant's permission to conduct research

1357 N.U.16

Mdantsane

5219

09th October 2013

Dear Sir/Madam

RE: PARTICIPANT(S) PERMISSION TO CONDUCT RESEARCH LETTER

My name is **Papama Febana,** a student doing Master of Education (MEd) degree at the University of Fort Hare (East London). I am conducting a research study as a requirement towards the fulfilment of the degree. I would be grateful if you could spare me some time to do an observation of one of your cooperative learning maths lessons and an interview.

I guarantee you that all the information that will be imparted in this study will remain confidential. Your name and the name of your school will be changed into false names and will not be disclosed for whatever purpose. They will remain confidential.

Thanking you for your cooperation in advance.

_____

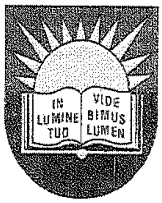
P. FEBANA

Student No: 200804853

Cell: 073 467 8582/ 063 017 5269

Email: 200804853@ufh.ac.za

7.2 Appendix 2: UREC Ethical Clearance Certificate



University of Fort Hare
Together in Excellence

ETHICAL CLEARANCE CERTIFICATE

Certificate Reference Number:	MOY05 1SFEB01
Project title:	**Teachers' practices of 'cooperative learning instructional technique in [redacted] schools: Implications for learner performance in Mathematics.**
Nature of Project:	Masters
Principal Researcher:	Papama Febana
Supervisor:	Prof G Moyo
Co-supervisor:	

On behalf of the University of Fort Hare's Research Ethics Committee (UREC) I hereby give ethical approval in respect of the undertakings contained in the above-mentioned project and research instrument(s). Should any other instruments be used, these require separate authorization. The Researcher may therefore commence with the research as from the date of this certificate, using the reference number indicated above.

Please note that the UREC must be informed immediately of

- Any material change in the conditions or undertakings mentioned in the document

- Any material breaches of ethical undertakings or events that impact upon the ethical conduct of the research

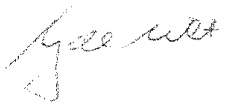
The Principal Researcher must report to the UREC in the prescribed format, where applicable, annually, and at the end of the project, in respect of ethical compliance.

The UREC retains the right to

- Withdraw or amend this Ethical Clearance Certificate if
  - Any unethical principal or practices are revealed or suspected
  - Relevant information has been withheld or misrepresented
  - Regulatory changes of whatsoever nature so require
  - The conditions contained in the Certificate have not been adhered to
- Request access to any information or data at any time during the course or after completion of the project.

The Ethics Committee wished you well in your research.

Yours sincerely



Professor Gideon de Wet
Dean of Research

06 October 2013

7.3 Appendix 3: ECDBE Permission to conduct the research

Province of the
EASTERN CAPE
EDUCATION

STRATEGIC PLANNING POLICY RESEARCH AND SECRETARIAT SERVICES
Steve Vukile Tshwete Complex • Zone 6 • Zwelitsha • Eastern Cape
Private Bag X0032 • Bhisho • 5605 • REPUBLIC OF SOUTH AFRICA
Tel: +27 (0)44 604 45 37 • Fax: +27 (0)40 608 45 74• Website: www.ecdoe.gov.za

Enquiries: Dr Heckroodt Email: bernetia@iafrica.com

14 November 2013

Mr. Papama Febana

1357 NU 16
Mdantsane
East London
5219

Dear Mr. Febana

PERMISSION TO UNDERTAKE MASTER OF EDUCATION: TEACHERS PRACTISES OF COOPERATIVE LEARNING INSTRUCTIONAL TECHNIQUE IN [redacted] SCHOOLS: IMPLICATIONS OF LEARNER PERFORMANCE IN MATHEMATICS

1. Thank you for your application to conduct research.
2. Your application to conduct the above mentioned research with [redacted] schools in the East London Education District Office namely: [redacted]. The Eastern Cape Department of Education (ECDoE) is hereby approved on condition that:
    a. there will be no financial implications for the Department;
    b. institutions and respondents must not be identifiable in any way from the results of the investigation;
    c. you present a copy of the written approval letter of the Eastern Cape Department of Basic Education (ECDBE) to the Chief Directors and Directors before any research is undertaken at any institutions within that particular district;
    d. you will make all the arrangements concerning your research;
    e. the research may not be conducted during official contact time, as educator's programmes should not be interrupted;

PGDP EASTERN CAPE

f. should you wish to extend the period of research after approval has been granted, an application to do this must be directed to the Director: Strategic Planning Policy Research and Secretarial Services;

g. the research may not be conducted during the fourth school term, except in cases where a special well motivated request is received;

h. your research will be limited to those schools or institutions for which approval has been granted, should changes be effected written permission must be obtained from the Director – Strategic Planning Policy Research and Secretariat Services;

i. you present the Department with a copy of your final paper/report/dissertation/thesis free of charge in hard copy and electronic format. This must be accompanied by a separate synopsis (maximum 2 – 3 typed pages) of the most important findings and recommendations if it does not already contain a synopsis. This must also be in an electronic format.

j. you are requested to provide the above to the Director: The Strategic Planning Policy Research and Secretarial Services upon completion of your research.

k. you comply to all the requirements as completed in the Terms and Conditions to conduct Research in the ECDBE document duly completed by you.

l. you comply with your ethical undertaking (commitment form).

m. You submit on a six monthly basis, from the date of permission of the research, concise reports to the Director: Strategic Planning Policy Research and Secretariat Services.

3. The Department reserves a right to withdraw the permission should there not be compliance to the approval letter and contract signed in the Terms and Conditions to conduct Research in the ECDBE.

4. The Department will publish the completed Research on its website.

5. The Department wishes you well in your undertaking. You can contact the Director, Dr. Annetia Heckroodt on mobile number 083 275 0715 and email: annetia.heckroodt@edu.ecprov.gov.za, bernetia@iafrica.com should you need any assistance.

DR. AS HECKROODT
DIRECTOR: STRATEGIC PLANNING POLICY RESEARCH AND SECRETARIAT SERVICES

7.4 Appendix 4: Researcher-Supervisor Bursary

School of Postgraduate Studies (SPGS)
Govan Mbeki Research & Development Centre
E-mail: wawusi@ufh.ac.za

University of Fort Hare
Together in Excellence

Dear MR P FEBANA Student No: 200804853

Re: Masters Supervisor Linked Bursary Award for 2013

I have the pleasure in informing you that you have been granted a Supervisor Linked Masters Bursary for the amount of R[redacted] for your Masters studies for 2013. This bursary has been awarded to you by Prof Moyo.

This bursary will be paid into your fees account as follows:
Firstly, 90% of the total allocated amount will be released in 2 tranches during the year;

- The **first half (45%)**[redacted] will be released and accessible by you during June 2013.
- The **second tranche (45%)**[redacted] will be released to you in August on the condition that we have received a satisfactory July Supervisor progress report before the 31 July 2013.

Secondly, (10%) [redacted] of this Supervisor link bursary award will be released to you in November 2013 upon a satisfactory October Supervisor progress report, received before 31 October 2013.

- Fees claim forms are available from GMRDC office in Alice and East London and these have to be completed to claim funds from your student fee account (if available).
- Fully completed forms will be processed and submitted to fees department once per week.

Please note and accept the following conditions:

- This Scholarship will be awarded for **2013** only.
- Satisfactory academic progress reports are imperative for release of funds.
- The bursary may be revoke if you hold another scholarship or bursary.
- You will be expected to contribute to a publication in a subsidy recognized journal.
- You will be required to attend one of the Postgraduate Thesis and Dissertation Workshops scheduled on your campus during 2013 (http://www.ufhgmrdc.ac.za/).
- **Students who fail to complete the qualification, for which the funding was awarded, will be required to refund the university, the total amount which was awarded towards the degree.**

By signing this letter you agree that you have read, understand and will abide to the conditions of the award. Please sign and return **a signed copy** either by hand or email (WAwusi@ufh.ac.za) to enable SPGS to release of the funds speedily.

Yours sincerely

Prof Cheryl Nikodem: Director: School of Postgraduate Studies 31 May 2013

Acceptance of bursary
I hereby acknowledge receipt of this letter and agree to the conditions. I will inform the SPGS if I receive any other funding towards my studies.

Surname _____ Initials _____ Signature _____ Date _____2013

7.5 Appendix 5: Observation Tool

TITLE

Teachers' practices of 'cooperative learning' instructional technique in six schools: Implications for learner performance in mathematics

OBSERVATION TOOL

Participants

(Mathematics Teachers)

October 2013

OBSERVATION TOOL

	*The numbers represent the number of times a behaviour is noticed									
CATEGORY	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Positive interdependence										
Individual accountability										
Promotive interaction										
Appropriate use of social skills										
Group processing										

7.6 Appendix 6: Interview Schedule

Title:

Teachers' practices of 'cooperative learning' instructional technique in six schools: Implications for learner performance in mathematics

INTERVIEW SCHEDULE

Participants

(Mathematics Teachers)

October 2013

INTRODUCTION

1. Purpose of the interview

The purpose of the interview is to conduct an in-depth study of teachers' practices of 'cooperative learning' as a method of teaching.

2. Guaranteed anonymity and confidentiality

Your responses will be strictly confidential and will not be forwarded to any other person(s). They will be used for academic purposes only. I do not require your name and you will remain anonymous.

3. Permission to tape

I request that I record our discussion in order to accurately capture what we talk about. The interview will be tape recorded if only you agree. The recorded conversations will be deleted or discarded immediately after they have been transcribed into text.

4. Any questions

Is there any other question that you want to ask or is there anything which is not clear?

INTERVIEW QUESTIONS

SECTION A: BACKGROUND OF PARTICIPANTS

Participant No:.....

Gender: Female [ ] Male [ ]

1. What is your highest academic qualification? .....
2. What is your highest professional qualification?.....
3. What grade level(s) do you teach?.....
4. What other subject(s) do you teach?.....

SECTION B: METHODS OF TEACHING

1. What teaching methods do you like most? (Probe)

---

2. What methods work best for you? (Probe). Why? Tell me more.

---

3. What method(s) do you think your learners enjoy most? Participate most? Learn most?

---

4. Tell me what you know about 'cooperative learning' as a teaching method. (Probe, e.g. What are its strengths? What are the weaknesses? How can they be overcome?)

SECTION C: COOPERATIVE LEARNING

1. Tell me how you implement cooperative group work in your classroom? (Probe)

---

2. Tell me how you divide tasks and resources during group work so that all learners are kept on task. (Probe e.g. What are its advantages? What are its disadvantages? How can they be overcome?)

---

3. Talk about how learners play an active role during group work. (Probe, How do you deal with off task behaviour? How do learners share knowledge and resources? How do learners teach and assist each other?)

---

4. Tell me what is your experience of the impact of cooperative group work for learners' academic performance? Tell me more. (Probe, What are the 'gains'? What are the 'losses'? Why? How can they be overcome?)

---

5. What are the 'skills' that learners learn during cooperative group work? Give examples. Say more. (Probe)

Thank You !!!!

7.7 Appendix 7 Consent Letter

25 October 2013

RE: LETTER OF INFORMED CONSENT

I _____ have agreed to impart information for this study research. I understand that the things that I say will remain confidential. My name and the name of the school will not be disclosed.

DATE SIGNATURE

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7.8 Appendix 8 Language editing certificate

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TO WHOM IT MAY CONCERN

I hereby confirm that I have proofread and edited the following Master's thesis using the Windows "Tracking" system to reflect my comments and suggested corrections for the author to action:

Teachers' practices of 'cooperative learning' instructional technique in six schools: Implications for learner performance in mathematics by Papama Febana, a dissertation submitted in fulfilment of the requirements for the degree of Master of Education in the Faculty of Education at the University of Fort Hare.

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Disclaimer: Although I have made comments and suggested corrections, the responsibility for the quality of the final document lies with the author in the first instance and not with myself as the editor.

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Appendix 9 Dataset

TITLE THEME:

Teachers' practices of 'cooperative learning' instructional technique in two schools: Implications for learner performance in Mathematics.

INTERVIEW TRANSCRIPT

TEACHING METHODS

1. What teaching methods do you like most?

FGP1: "Okay, okay, first of all what I would like to say, is that, I wouldn't say that there is this one specific method that I'm using in my teaching because it will depend *endlini*, in the particular circumstance, *okanye*, the particular area that you are dealing with and as a teacher I think that your lesson will not only be presented in one teaching method. You need to utilise all your teaching methods not necessarily all, they maybe two, they may be three, for instance, if you are introducing something that is new to learners. I know that basically for *i* baseline assessment you got first to probe the kids to find out what do they know about that particular concept that you are bringing? Maybe some of them may have turned in-depth in what you are going to give them, then you can start from there expanding, giving task, more knowledge. So, basically is that now, okay basically is that now when you are introducing something that is new, I think that, most mix, some for instance, you may use, *intoni?* The telling method, because you are bringing something new, to the *ntoni,* to the kids, but not necessarily ke ngoku it will be the telling method because as you go about in your lesson because there may be some areas that may be familiar because all of it is not well because even if, for instance, you are dealing with *i* concept *ethile*, for instance, let's say *i* probability at grade seven. They've done *i* probability *kwa* grade six, but we are dealing with certain section which we deal with *kwa* grade seven. So, it means now, they will be coming with their information, then we can move from that information to go to your *ntoni?* To your information, so that is why I am actually saying that. I don't have a specific method to, to, to, to teach my lesson. All those they form an ingredient in order for them to proceed, something that is more progressive within the learners. But you will find out maybe in your lesson you use maybe ninety percent of a methodfor instance, we know that we teach i knowledgein learners; i knowledge is what they already understood from the previous grade or from the previous lesson. We also attract their skill in your teaching even if it's teaching. The skills that you are going to give them, but some of; the basic skills they have met in their previous grade like for instance, i addition, i subtraction, i multiplication they crop up in your new lesson but all those skills they've already met from *phi?kwi* previous grade. You may have i routine knowledge, which means i routine knowledge is like i time-table where they don't have to think, are those answers which they don't have to think about them because they have been hammered in the previous grade. But we do have i complex, for instance, and problem-solving situation, *wena uzo* learners *ke ngoku* they got to be creative. It's where *ke ngoku* as a teacher you are teaching them to be able to solve but using something like formulas, for instance, because they cannot solve a data without having at least a prior knowledge of solving this. So, that is what I can give up it's just a mixture."

SIP2: "The teaching method that I like most, are, discussion method and exploration. I would say exploration because sometimes I allow the learners to explore, and then, I just watch them as they work."...."The other, it can be the discussion method, aaah, where*, kaloku kukhwezi* terms *zintsha, (laughing)* the, where learners are able to, to bring, to, to, to bring their own problem solving skills, that is, for instance, the explorative method. We can, also, for instance *i* peer-coaching, for instance, where you can use some of the learners in your class, you group your learners, for instance, in your class according to their potential where you mix them, so that the others that are able they can help the other that are not able to cope. So you can also use *i* peer-

coaching in you class, you can also use i group discussion where, for instance, even if you didn't put your learners according to their academic *nto,* even as the ordinary group you can also use that."

HLP3: "Telling method or explanation method, question-and-answer method, problem-solving, and discovery method." (*The participant speaks so fast that it was gonna be difficult to write and engage face-to-face with her at the same time, so I pleaded that I must be allowed to record, it's then she agreed doing the first question again*) Ndithini ngoku? .... "*Uba* question-*e abantwana, u*-pose-*e i* problem *ebantwaneni.* You pose the problem *nge*-existing knowledge, so that, *xa usiya* ke, *uman'usenzisa bona 'manebephendula* coming *kule nto kufuneka uba* teach-e yona, uyi-relate-*e nala nto bayaziyo kula* existing knowledge of, *ibe yi*-integration. *Mhlaw'mbi ubabuze, mhlawumbi uba* teach-*i* maths for instance, *uqhin'uye kwi*-geography, *uyakwaz'ukubabuza pha kwi*-geography, *phaya* it means later on *i*-integrate-*ana nezinto ezidibene ne*-maths, uyabona, qaphele."

GNP4: "Well, *xa ndi titsha, esikakhulu ndithanda ukusebenzisa i* question and answer method, *yeyona indisebenzelayo*. Because *ngayo ikakhulu* you can probe and then *u* gauge *ukubana* how much knowledge *ababantwana abanayo* then *uthathe njani le* concept ufuna *ukuyititsha ukubana* are they really *mhlaw'mbi ukuba bayi* understand-*a kangakanani na*? What is to be consolidated *kule* concept *ufuna ukuyi* introduce *okanye le* concept *sowuyititsha, uyaqonda*? Although sometime *sowubeke loo* question, *ubon'uba ab*a-move-*i,* then you need to tell sometimes, *usebenzis'i* telling method, some *itsho (A learner is asking for another teacher, the participant is responding likewise*). Although sometime *uphele usenza i* telling method because *ubonuba, heyi*, the whole class *i* stuck imile *ngoku. Awukwaz'udlula ngaba ngabuza* another question *uba ithini, haibo, ayenzi lento ufuna ukuyizisa apha kubo uyaqonda? Uyaqonda?* Then *nenye ke* sometime *endiyi sebenzisayo i* discussion, especially *yona* not *is'kakhulu kwi* maths, *ndiyayi titsha ne* EMS*, i* discussion method whereby you need *ii* input *zabo*, some sort of, *i* debating so."

SAP5: "Rote learning formulas and mental bonds. Conventional approach, cooperative learning, problem solving, cultivation of mathematical enquiry, ingenuity, creative."...." Mmm, *(pause)* now the rote learning it's where the learners they memorise, for example now, when they are going to do the multiples, so they're going to do their multiplication tables, so-that they are rote learning. By doing that, method of the rote learning so, you want learners to master, you want them to memorise, so that is *eee* you give them a quick exercise, so-that now they can do it *eee(showing a sign language)".* .... "*Ja*, so that now you want to master, for example now, the division, so they would do their things, and they'll go-back to their multiplication table and then give them a quick exercise so that they are rote learning. At the same time the rote learning also *eee,* which now have a quick addition, and also subtraction. So that the learners they have a tendency of not putting the, each number under its column. So they just add, so you want them to master a certain approach. So, so, so which means that now, our maths, *eee* you don't want to put the learners, mmm most of the time, they are using, they like to use the calculators and also the cellphones, so you want them to use their mind. So that's why I say rote learning, *eee*, it is most appropriate, *eee*, because in now-a-days' learners they are lazy."...." -i problem-solving method, eee you want the learners to think constructively, you want them to solve the problem, firstly, in their environment, and then, after that now they can solve the problem, that is, beyond their studies, they can solve the problem in their daily lives. *Eee*, the problem-solving method, for example, the learners start doing quizz, things that involve percentages, money, so where the learners, *mos,* we are dealing with the learners from age eleven, *eee aaa* I'm doing grade six and grade seven. So you are dealing with learners starting from between grade.".... "The conventional approach, it is similar to to cooperative learning because now, the learners now, they are working in small groups. And then now they are working in small groups, so they are going to exchange the the their ideas. They are going to swop the from what they learned, at the same time, the learners they are going to gain confidence from each other, because of the small amounts of groups they are working-in. So that now, they'll be able and the teachers to see the profit it would be, the supervisor now, it will also be giving them the guidance. Upon now, the problem is that now, people they have a tendency of just giving the learners without explaining, you have to explain to them because of their age. At the same time you must build them, you have to work with them, and then rotate."...." Rotating around those groups, explaining if now they are experiencing difficulties then, difficult can't be explained to us, then it is similar to cooperative learning. At the same time the learners in that approach, they gain *eee* a self-esteem, also they

gained the confidence because they are going to work together now, then they will be rotating, then they will see that now, they way they under approached the maths problem."

FGP6: "Most of the time *mna* it has to be a discussion thing (*Interruption, a teacher comes to open windows*). First question when coming to class one thing that is important, *mos,uba*-question on prior knowledge before anything because there is no way that you can get into your lesson without knowing how much your learners know, *ne*, and I prefer *i* group teaching, *ne*, I separate my learners into groups. And I make sure that *kwi* groups *ezo,* I group them according to *ii* abilities, I mix, *lanto izawuthi ii* under-achievers, *ii* mediocres, *nee* top-achievers. The whole must be part of a team, so that everyone gains from each other because it doesn't help *intoba ufane ubeke ii* top-achievers, *ubeke ii* under-achievers uyaqonda? Because *akukho mntu u* boost *kanti* if *abantwana bakho* are group and *zonke aza* stages are there it's easy for them for instance *abantwana ixesh'elinintsi* they learn easily for, *i* peer education. Unlike *uyakwazi ukuyicacisa into ucin'be fanub'uyicacisile. Kanti xana belapha* e group-*ini*, *kukho ezi* top-achievers *mos zinayo le* insight *yalento, kulula xana umntana ecaciselwa ngomnye,* unlike to say *into yokuba* for instance *abantwana mos abafani ne? Ekungafanini kwabo* they view you in different way. It might be that *abanye bazakus'ke bakucacisele intoba*, no this is what she or he want *u tishara wethu*. But *abanye* in you *babona* this figure *ede'ske ibenz'itoba babe* tense. Hence, they are not that far *ufumanise kengokuna ke akulululanganto i* information *le uyi* present-*ayo*, instead *ukujongel'intoba ngaba, utishara ndiyamoyika, uyayibona?"*

DDP7: "Problem solving and cooperative learning."…. "Problem solving is a form of learning where learners apply their existing knowledge to a new situation so as to gain new knowledge. Cooperative learning is when learners work in groups that are small enough, that everyone has a chance to participate in a given task without any direct supervision from the educator"

2. What methods work best for you?

FGP1: "One method that works best for me is the method where the learners find-out things for themselves. As much as *ntoba* I am partly using the telling method, but I am also using that method where learners can explore to find the solution for them and also the group work and also the groupwork method because it's where now the learners *(Interruption, caretaker and staff member talking over the parking lot)* the groupwork method it's where the strong learners can be able for instance, if for instance, aaah, for instance, I can put a concept to the learners and think that I've put it in a sympathy way but you'll find out there maybe those learners tha haven't even grasp it, what are you talking about, even if I as teacher think that I've put that in the most simplest method. So by also giving group work or group discussion, it's now giving *i* chance now to the other learners because when learners they discuss something amongst themselves they've got *i* confidence because some they may fear even to be able to communicate with me. But now, when they are discussing among themselves, so you are also building in confidence on those learners who don't want to participate, and also you are building *i* confidence on those learners who already know. Because, well, like when you help people with what you know, the more you become confident, and the more it stays in your memory."

SIP2: "A method that works best is guided exploration because if they explore and they are not guided they may take a route that may lead them to incorrect conclusion and calculations. So, the best way is to allow them to do exploration for as long I can hear what they are saying then I know they are on the right track, because when they do exploration I walk amongst the groups, so that I can pick-up what each group." …. "It, it, what we do, we, we explore, and then later on, we take a situation, a current situation we have to, let's solve this, so we do some form of a classwork. So, they all do the classwork, and then, mmm, they finish and help one another."

HLP3: "*Yi* problem-solving method, because *kulaph'abantwanaubabona khona* whether they understand *lent'uba*-teach-a *yona, ee, ubeki*-problem *phaya* after *ububa*-teach-*ile* and then *kengoku abantwanaba*-solve *i*-problem, *ubanik'i* practical-activities *ba solve ke ngoku i* problem.Then you check whether *umsebenzi wabo* is correct or incorrect *phaya, basolv'ii* problem. The more *besolv'i* problem, the more, especially *apha kwi* maths, they become perfect because *baya* practise-*a ubanika nji* practise, uyayibona? …. "I'm sure *i* discovery method the one, because something for instance *ndibanike i* project, n*dabanika* some few weeks *uba*

mabahambe bayoyenza bayi investigate *bayi* search-*e*, so *umntana aze nalo lantuka yakhe, lonto ay*i discovery-*shileyo kulo* topic bendimnike yona, nomnye azenenye i topic yakhe. Which is *umntana awuzothi* u wrong because *yindlela yena a*-discovery-*ishengayo, yena ayibone ngayo. Mhlawumbi uthetha nange career yakhe umntana uba ufun'ubayintoni* whatever, intw'ezinjalo uyaqonda?"

GNP4: "I think *yi* question-and-answer *e sebenza kak'uhle*, because it can tell how much *i* knowledge *abantwana abanayo* and also what steps you should take *wena* to consolidate into *eyaziwa ngabantwana. Okanye*, because *lanto yokuthi oohili*, iknowledge*, i tsotsi* telling method, ibenz'abantwana babe *rrrrrr, bakhuphi* pen *kule* lesson *yakho*, because *bayahlala bamamele, ubengathi uyi* preacher *wena* ngoku. *Okoko, uya* deliver-*isha kubo*, you are not sure whether they understand or not. Then *kwi* question-and-answer method *kulula ukujong'ubana* no *ngoku baya* understand-*a* na ngokuor *aba* understand-*i*, so I need to consolidate or I mean to go back and do something, *ja, uyabona*?"

SAP5: "Rote learning, group work, cooperative learning, and problem solving."

FGP6: "For instance, at times *ndilanto ithi u* one *ngu* one, ne you present your lesson, then you try and try and try for u one ngubani, unike each learner individual attention, trying to find out intoba uyi receive-ile na le information yindawuni le angayivanga? Because it doesn't help intoba uleqe ukugqiba whereas some are still legging behind, so that's one prac session I think."...." "Both (*groupwork and one-on-one*), but one-on-one, if needs be. Why I am saying so? Is that our learners at times they have a tendency of teasing each other. Now, when they are in a group and one, it has to be always up to questions. At times they tend to ridicule that one 'oh you are always asking questions' why is that you always the one who doesn't know anything. But when is a one-on-one session the learner is free to express whatever it is that he doesn't understand and try and bit time to clarify understanding unlike per thinking end of a situation because learners in a situation one would ask a question and the one would say, *haaah*, god it's easy, then the learner that person doesn't feel like asking a question even if it's relevant because he is afraid that okay ubani understand (*Interruption, the participant's mobile phone message ringtone*). Now that I'm going to ask a question, then it will seem like I'm stupid on that. But when it's a one-on-one session even as an educator you need to create a conducive environment. Let the learner know that it's not that you are stupid that you didn't understand, but it is maybe the approach I'm using, so be free express yourself up whatever you want to ask. So the one-on-one works better because there is no interference of the other learners."

DDP7: "Both methods..."...." "Problem solving engages pupils in the problem and each learner becomes curious to contribute. It shows how learners can think differently. It works for me because I can see how learners can use what they know to get something new. It shows learners who can really apply knowledge to reality. Cooperative learning on the other side builds confidence among learners. Learners learn to appreciate each other."

3. What method(s) do you think your learners enjoy most? Participate most? Learn most?

FGP1: "Okay, okay, aaah, for instance, it's a small portion of learners, for instance, even these years that I've been here or teaching at high school, it's a small portion of learners that enjoy the telling method. And you'll find out those learners that enjoy the telling method, are either those learners you feel that, they want you to give them information, because their academic or potential is *ntoni?* is low for them to understand. And also some are lazy, but you'll find out that if you give the learners the chance for them to find out something from, from, from them. To be able that is the discussion, you'll find out *intokokuba* , as much as this method you'll find out one may say your class is chaotic, but as a teacher you got to be able to control your, your, your, your class as much as *intoba* some teachers may say, for instance, it's taking a lot of *ntoni?* a lot of time. Because you'll be giving that time for them to discuss, and you will find out *intoba* even during, a double period for that matter, you will not end up being able to *ntoni?* to summarise what was supposed to be done. But to me it worked very well because at the end of the day the learners are very active, and as a teacher, *ke ngoku*, you will be able from their views to find out *into'kubana,* oooh, this partiular group they have understood what we were talking about, and also in this group, there are still these two learners that haven't understood. And it gives you now

a chance for you to be able to push specifically and help those few individuals. And letting the others continue, for instance, if you give them an exercise, for instance, we do have i work-books, where they can continue now, with the work-book, aaah, consolidating what we have already discussed. And you can go around now helping those that haven't discovered the work for."…. "Both methods."…. "Where the children take from you, and sometimes it also, that is why I say it also depends, for instance, on concept whatever you are talking about, you are dealing this about. For instance, some concepts, for instance, may need more story, more telling from yourself, and you will find out even if at the end of the lesson you are trying to find out from them. You'll find out that most of them they have acquired what you wanted them to acquire. But sometime even if you are using that method, you'll find out that at the end of the lesson you'll find out maybe fifty percent has understood what you are talking about or fourty percent, wena, you'll find out that you've got to start, for instance, again the next day if the lesson has ended on that day or you see for instance you give them a classwork to find out if they understood, but you find out that, not all of them got to go back. So that is why I say, I cannot say specifically they learn from, from."

SIP2: "The method I think they enjoy most is a combination of a discussion method and exploration method because they do it among themselves, mmm, I think they enjoy it because I could see when, I'm, I'm talking people might see that they relate to one another easily, they can talk freely in a group. And some of them can provide that, that we should, we must not forget this, to say. So, they reminding each other on, on the details, on the information that they need to have. Or they remind each on the steps that have to be taken during certain calculation. They enjoy it instead of me leading them and asking them questions, sometime they become shy and don't want to raise-up their hands. Or they are afraid of speaking in-front of the whole class. So, if they'd, if this, if they talk instead of, about five learners they feel free."…. "They enjoy it because, mmm, sometimes they are scared of my big voice, and they are scared of certain characters such that, so they wouldn't want to do anything in-front of the whole class sometime. Work, with about it's in for them, and it's not a big stage. They put the desks together, so they can keep the eye contact, they can work in very simple, in that small group, and they know it exactly what needs to be done." …. "Mmm, they participate most when we do, mmm, the one that we did recently was geometry, when we have to do calculation of angles of a triangle. In that, they had to have a triangle, and cut the corners, all the edges of angles of a triangle, so that, those angles could be one-eighty degree. So, they were all participating, they have draw the straight line, each angle have to be pasted very carefully, so they all were working, each and every one of them making sure that the angles are kept together, they are pasted, actually, fixing together. So, they all participate, and when they do that I have to be moving up among them. Because, sometimes they mess-up the process and I have to start from the beginning again. So, they learned from other and the other kids, some, how to do this, you see?" …. "So, I will say, they enjoy it and they participate, they enjoy it more when they achieve quicker than others. So, if one learner is quick doing that, and then, they look around to see who is struggling. And then, that is when they help each other. So I would say they learn, they participate and they enjoy it, because when they do the task, they do them and finish and wait for another one to come."

HLP3: "Ewe, they participate most *kaloku*, because *baya* participate, because la discovery method *kulapho umntana azikhethela ngokwakhe afuna i* information *mhlawumbi i* clarity through *i* parents, through *mhlawumbe* whatever *mos ibalul'ezi* points *zakhe bezisenziwa nguye*. I think is the best, *baya* participate*, umntana uyazenzela ngokunokwakhe uyaqonda*, unlike *apho ubuzabaniki* groups, *uzabanika, uzenzela ngokwakhe* la project." …. "*Eee-e*, they learn most, because *ufumani* information *apha kwi*-internet, *aphinde ayitshekitshe mhlawumbi kwi* friend, author, *ayitshekitshe kwincwadi, ukhubone*? *Aaphinde afumane* i information *kwi*-friend, *alantuke* i information (*A passing object taking the attention of the participant)*

GNP4: "(*Laughing*) *Zona ke zi enjoya u* telling method because they don't, sometimes they don't want to, *uqonduz'obuzi* questions, because *umhlawumbi ebantwaneni ufike, yobana uzabuza, yho andiwazi lombuzo. Xa sendiyicingela, uyabonuba umhlawumbi uzabuza, ngas'ke kubo ngelihlobo ucinga ngalo uba* more *ku* tell cause *ndisitsho nje, like umzekelo, ukhubuzu-buzu-buzu-buzu ubonuba i* class is stuck, *uyaqonda ke?* Then *u* decide *uba*, no *maan*, this concept *yenziwa nje na njena nanje nanje lento. Ubon'emvakoko ub'umntana, oooh, siyayazi mos le nto. Kutheni? Yile nto bendiyibuza, uyaqonda? Ngoku ba* releaved *nje mba ukhe wayixela, wayi* pass. *Hayi maan le nto ithi-ithi-ithi-ithi yile nto, bathi oooh! Ndithi, jaa, yile nto bendiyibuza ke le ningayiphenduliyo, uyaqonda?"*

SAP5: "Experimentation, especially in probability, and group work cooperative learning."....
"*Mmm*, you cannot say that they are going to participate in one method because you are going to use a different method, *ja*. For example, in a rote learning now, now you are checking their memory have they mastered the stuff that you have given to them? So which means that now the learners they are participating in a rote learning. And also in problem-solving method, so this problem-solving method if now you have given them a group task, *eee* they are working in groups, so that there you try to, so that there will be a maximum participation on this group members. At the same time you are going to help the one that's going to lead-on the group. Also, you would be also moving around those learners checking that now they would be sorting their ideas. They'll be giving each other the approach that they have used, so which means that now, mmm, also this problem-solving method now they'll be participating most on."...." The problem-solving method, because they are going to learn most, because they are learning in groups. Also, so in a problem-solving method the teacher must not take a back-seat, it must be also invol- around those learners. It must check the maximum participation, are these learners all of them they are working together."

FGP6: "The participation is maximum in group work."...." It's maximum in groupwork because one has a role to play and knowing that I will get a mark because I've worked for it. In, I'm not going to get a mark because the group has done well. I'm going to get a mark that I've worked for and it brings about that sense of competing."...." I know I've worked hard, so that I can prove myself to the group that I can do this, so everyone wants to shine, so that's where that's where it's come to a point when everybody wants."

DDP7: "They participate more in this method because learners always want to compete with each other. Each member of the group is assigned a specific task so each member strives for success."

4. Tell me what you know about 'cooperative learning' as a teaching method. (Probe, e.g. What are its strengths? What are the weaknesses? How can they be overcome?)

FGP1: "i cooperative develop, *uzandilahla ngoku (The participant is ironically laughing)."*....
"*Ndiyayiqonda."*.... "That is why I'm saying, I said that, most of us you find out *intoba,* they avoid (it) most of the time in their teaching because, as much as *intoba* learners can learn from each other, they can share, they can gain *i* knowledge, and it builds *i* confidence, and so-on. But at the end of the day it takes time, because you use a lot of *ntoni?* a lot of time. And secondly, as a teacher it means you need to prepare very well for it to be *ntoni?* to be successful, I cannot promise (*Interruption, participant's mobile phone rings*)." .... "It doesn't mean that as a teacher you don't prepare, you are suppose to prepare, as at *(Interruption, paging a mobile phone)*. So, I cannot just come to the class, just like to, to that is the previous day and come tomorrow and still I am going to introduce; due to this today I'm just going to give them and discuss these as *ntoni?* as, as a group because as, even if you were doing the, the, the telling method there may be some things that may crop-up from your lesson which will help to, that is the 'prior knowledge' which may help you in order for you to move. But you will find out is that one other thing that they will know that in prior knowledge you will find out is that, you got first to start from your prior knowledge which you think you are going to move-on or you would lead-on. So, even *napha kwi* cooperative teaching method, it's not something that you can just wake up and say tomorrow, no I'm going to be make and do this, because to me it's the more exact thing unlike the telling method because I'm just giving them what I know that I'm suppose to give them maybe the concept is definition, then we are going to do this example together, one, two or three examples. Then I find out from them if they understand. So, it's time consuming, it needs a lot of preparation and also as they are discussing in groups, something that you were not aware, may crop-up, and it can change the whole scenario of your lesson because you cannot say, no let's just shelve this because we are doing this for today. Because that something that has crop-up may also be part of your *ntoni?* of your lesson. Of which now you suppose to be able to *ntoni?* to create. So, it has got a lot."

SIP2: "Mmm*, i* cooperative learning, mmm*,* in my understanding, it is a method where learners in a group learn by cooperating. They learn by doing the bits of tasks to achieve the task that they are given as a group. So cooperative learning will be one learner learning from the other learners

in a group."…. "The strengths of cooperative learning are that the learners from my experience, they can learn a lot amongst themselves. They learn a lot when they sit together and do things on their own. *Mmm*, because the, the, learners that I'm teaching are between the ages of ten to thirteen, so they like a lot to be imitating what is, mmm, what is another member of the group saying or what are they doing and they emulate what is done by the other. So, they all participate and want to achieve because they can see others progressing and they can listen to them and talking and they also want to know these things that these guys are talking about. That is, one strength that I know about cooperative learning. Also, it can be, it can be problematic, in that, there are those that'll not be active and they will be passive. They won't participate in a group; they look at group work as something where the teacher is not excellent and allow others to do the work. That is one disadvantage of it. And also, there can be elements of bullying if it is not closely watched."…. "Because some learners in all that they are afraid of older boys in class or some learners should afraid of girls who that are viewed as talking too much or talkative in a group, who will sometime turned to lead the thinking of others into a certain direction and kind of influence their thought process, influencing what they need to say. So, it can be a challenge in that, but I think the teacher needs to know exactly what needs to be done in that."…. "In order to overcome, because it is just a challenge. In classroom, in a group there will be one learner which is problematic."…. "Then what needs to be done, is that, there is a interference (*An interruption, a staff member entered through the door.*)"…. "I think the teacher, the educator need to know the strengths in, in, in forming up the groups, because if you allow the learners to form the groups of their own they turned to be friends. And now you have to, I think the educator have to mix the groups and get those that have high strength and those that have low strength to be mixed-up and to watch closely those that will be problematic."

HLP3: *"i* cooperative learning *kaloku*, is where the learners work together, sharing ii ideas, solving ii problem, *eee*, mmm, *apho khona u* explain *bazi into ozi* expect-*ayo*, they work as a team, like even *kule* cooperative you group them according to *ii* abilities but *ke noba uyaba* group-*isha* you cannot take *ii* gifted learners together at least *kufuneka kubekho i* group-leader. *La* group-leader *izak'bayiyo ethi* see to it *uba kele* learning *bayenzayo iyaqhubekeka na*? Like *uthathe i* gifted, *uthathe i* mediocre *udibanise la* group learning, *la* group *kula* cooperation. So they learn more because *kufumanisek'ba abanye bafumana* more information, *baya* gain-*a i* knowledge *ne* skills, *kulanto yabo*."…. "*ii strengths kaloku* is where they gain *i* knowledge, *ii* – skils, *baya titsha*." …. "*Ewe i* weaknesses *zisengakhona* because you'll find that *abanye abaparticipate kwalaph'e* group-*ini umntu njee, uhleli njee kubefun'uku* gain *i* knowledge *akana* input *ayenzayo ngalaxesh'ahleliyo solok'e* gain-*a i* new knowledge *amane* gain-*a akukhonto yena ayenzayo yena ngoku ahlele phaya, ndingathi zi weaknesses ke ezo*."…. "I think, to overcome them, (*another teacher whispering to the participant)* to overcome that *kufuneka kukho ingxaki, ubene* rules *ozibekayo* of which that if *ubanik'i* activity as group then *kufuneka ba* share-*rishe* if there are ten(10) questions *ba* share-*rishe omnye enze* two questions, two questions, two questions, two questions, two questions and they come *ilantuke i* outcomes *zam, umntu abone kengoku umntu afak'iscelo ithi* come together *xabebonke* so that *bangafumani* chance *wonkumntu akwaz'uba umntu athethe, uyaqonda? Ndiyayicingu'bayintwenjalo, inoba yintwenjalo* so that *wonkumntu azokuthi* take part, *kungabikho abantu abazokuhlalanje."*

GNP4: *"i* cooperative learning method I read about it and head about it, whilst I was doing BEd, Hounours, uyabona? It's when *ndabane* interest *kuyo*, I don't know whether *ndiyitolika* right, but *kuba bendenz' i* learning I believe it's whereby learners work as a small, *uyaqonda*? Then, mmm, working as group, *uyabona*? They are given task, whereby they have roles to play. After roles to play they work in groups, *ii* tasks *zabo bezenza* cooperatively, that is working together, whereby one would be a scribe, one would be a chairperson, but helping each other in the process of learning. But to me I've never use it more often, because, although *yona* is a very good *lanto*, teaching method, because everybody is involved *kwi* learning. But I think, for *i* situation *yam, nendlela abantwana bam endibajonge ngayo*, it needs learners who are very prepared to work. And also learners who know what roles they should be playing *kwi* group *yabo, uyabona*? If given a role, *ukuthi* okay, *mna* I'm going to discuss le section to 'my group', *uyaqonda? Uzaa*, so I need to go and research and do something like this, then *abuye a* discuss-*e le* role *yakhe, uyaqonda*? Because sometimes if you need, *unika abantwana umsebenzi* as a group, *nomsebenzi.* Someone, they don't go presently, *uba kube ku* discuss *izinto*. You will find *into yokuba fumanisek'ukuba kukhek'ubekho umntana oyi* one *oy*i understand-*ayo mhlawumbi le* concept *oluhlobo ayi* understand-*a ngalo, ufumanise into yokuba* they have written the same thing *bonke,*

uyaqonda? So, although *yona* is a good method *kubantwana* really prepared to learn, but *kubantwana abonqenayo i* weakness *yayo ilapho*, *i* need-*a abantwana abafuna*, they are prepared to work and *nee titshala ezi* prepared to work, ja."…. "I think yona *i* strength *sayo* is that, would be that, everybody is involved, one, *kwi* learning because everybody is cooperating. Everybody is working, even if it's at home. So everybody will have a chance to know what's taking place. And how? *Le nto iqhubayo*, *iqhubanjani na, nditshubana* even enhance *i* teaching and learning *eklasini* would have, less and less *lanto*, few and few failures because everybody is involved enjoying *i* learning, uyaqonda? Nditshuba yona it's an ideally, in an ideal situation*, uyaqonda*? It would be working very much in an ideal situation, *uyaqonda*?"…. "And over, I think also *(Somebody coming at the door and speak to the participant)* okay, okay. No I think another weakness *enayo* is that, *i iiibe* not right, it depends *ukuthi* whether *wena titshala kwazi bani*, have you prepared *kakuhle na i* lesson *yakho*. Because you may end up not getting one *le le*, achieving *ii* aims and objectives *ze* lesson *yakho* if *mhlawumbi* there has not been a thorough preparation *ye* questions and what it means to do, because they end up with *ii* information *ibe ingeyiyo wena tishara le ubuyifuna*. So *i* need-*a* a thorough preparation on the side of *utishara, uyaqonda*? So, if *u tishara* is not thoroughly prepared, has not prepared thoroughly, *uyaqonda*? It may end up *ne* risk; *i* negative or *i i* information *engeyiyo le ebeyifuna yena utishara.* And also, *ooo*, I'm not undermining *ii* learners *zethu* in our township schools, some of the issues *kubo, ooo, ii* methods *sizisebenzisayo* are new. And it take time, and for instance, *ezinye izinto* they need *babe*, *zonke*, like you go to the libraries, you go to *i i i i*-centres, *mhlawumbi, u* research-*a*, and you need to, *ubuzi* parent. So most of the time *abanazi* support *abantwana bethu*. Even*, nasemakhaya*. Even, *nasezi* community-*ini zethu*, whereby, let's come up*, kwinto yokuba*, okay, I've been given this task *endizawuyenza* which will impact *kwi* group *yam*. I've been given this task *endizawuyenza*, *so ngoku ufamanise uba akana* support even *kwasekhaya, uyabona*? So, it's very difficult to implement *i* cooperative learning *kwi* situation *ezifana neyam, uyabona*?"…. "I think, we can try and have *i* support *ye* committed parents *zabantwana, ziba* support-*e abantwana babo*. And, also, *even kwi kwi nakwi*, now although it's a good thing, e*zi zi zinto zi* prevail-*ayo zine* negative impact *ekufundeni kwabantwana zinganeli kukuzama ezitishara*, will try, even if you are not actually doing *lento ifunwa yi* cooperative learning. But at least try *noba mhlawumbi uyenza* fifty percent or thirty percent, at least try *ngento* not just *usongizandla uthi* well the situation is bad I'm not going to do it."

SAP5: "Grouping learners into smaller groups whose members learn from each other to attain shared goals."…. "It is learner-centred, it develops social and interpersonal skills. It enhances teamwork, they learn to accept and respect each other, freedom of expression. It helps create self-esteem. Discipline is enhanced, develops empathy, and fosters responsibility for learning. Helps the teacher to keep students engaged."…. "It involves a lot of careful planning to cater for all small groups. Some learners may become dominant and others recessive needs, close supervision or learners may discuss their own things. It takes a lot of time. Overuse of cooperative learning may create interdependence causing problems in individual work, for example exams, consensus is difficult especially on matters or topics that are subjective."

DDP7: "Learners accept each other, there is peer support, there is less disruptive behaviour, learners view the situation from the perspective of others."…. "Some learners can be shy, some need more support which others cannot afford to give. To overcome weaknesses learners have to be taught skills for participating effectively in group work."

COOPERATIVE LEARNING

1. Tell me how you implement cooperative group work in your classroom?

FGP1: "Okay, what I would like to say is that, first of all you got to look for instance at the topic or concept that you are dealing with, not all of them will automatically mean that you got to use i cooperative method yes in dealing with it (*Interruption, somebody at the door*). So that I'm saying that it doesn't necessary mean that all the topics or concepts." …. "*Ewe*, because i cooperative may have i advantage and its disadvantages. I got to come into the class and do *i* cooperative, okay. Class! We are going to do this, or discuss. I want us to talk about, let's say, we are going to do i patterns today, and say turn to page so-and-so e are going to discuss and within i groups. So as a teacher you've got to your work and try, you got to know the content of your syllabus."….

“Ewe, olden days, and plan your work, that at least for this particular activity I’m going to do this and this and this, then this is going , if you know your work, you will know that at least I will be able to use i cooperative method in this time for me to be able, I want to find out *intoba, fo*r instance, you may use that to find out *intoba* do they know this before even, doesn’t necessarily if its new knowledge before even you can teach, you can also use i cooperative method, also for work that you think they *ntoni*? they know. Even for grade five work because it’s an introduction to what I am going to do again, you may also give that, so that is why I say that i planning *yintoni?* is very important so that you will know *ke ngoku kwezi* stages *zakho* for this activity step one I will be doing this, *u* step two I will be doing this, so it means i preparation and it will not just wait because you are going to do *ii* fractions so I’m just going to throw them so it needs a little bit *i* in-depth and *i* understanding *yakho*.”.... “No, no, they can, yes, yes, they can, to do them, they do that. But they must know that there must be someone who is responsible for this, someone who is responsible for this, or also, even, someone who is writing the *ntoni?* the responses and now organising but all of them. Whilst, the one is organising it doesn’t mean that they will be sitting because they are suppose to monitor, that what is being done, so they are also involved although these are different stages, one is doing this, but at the end of the day, all of them they are involved in all those *ntoni?*

SIP2: “I don’t always use group work, in data-handling and section that involves medians, and all the, thermometer and all that, and the time. But whether you give them instruction and the instruction sometimes you, you, you put a scenario, so from that scenario that I think they have to watch. So, there are people that need to make sure they understand the whole group understand very, exactly what is it that the state scenario is all about. And then, another say, one other person will say, okay, what are the steps involved in this? Here are the steps involved; this is what we need to do, everybody is listening so that if there one of them is making a mistake then you simply correct that. So steps that need to be, be and then, mathematically, what is it that we actually need to do now. This is how we calculate; this is how we get to the answer. So, not one person is going to do all of that, they have to divide it amongst themselves. It’s about comprehension, it’s about application, or think it’s about understanding of the question, it’s about application of the calculation or the method that they’ve learnt, it’s about making sure that, okay, let’s start from the beginning again that we got everything correct, so they all come together to make sure that it is correct.” ....“When we, when I implement cooperative learning, first I have to explain to them that they are going to embark on a groupwork, and in this group work, mmm, there are things that have to be achieved in each and every report. So, they all have to cooperate and in a group of about five. There is going to be a group leader that will assign duties to all of them. They must cooperate with the leader to achieve the results of the group otherwise if they don’t, they going to be delayed and they won’t get them out.”.... “My strategy is keeping everybody working, and I make sure that the group leader will assign the task to all of them. If for an example, they are doing the exchanging of one currency into another currency, one will have the calculator and another one make sure that they all understand the question, will be asking questions. So they all have to come up with different inputs into, into the group *(An interruption, somebody is knocking at the door.*).”.... “Small groups of about four to five, not bigger than, because in a group of seven to eight, you find to, not about participating in a group; and find four that are as team, so I team a number between four and five, yes. Sometimes, if they have to, they go up to six, but I usually avoid if you’re talking about six people, because there will be one, two that are not participating in a group, when you are talking about three or four people that are not doing their task. I like it, *ke ngoku*, because I want all of them to have something to do. If they are eight, there are those that will be just folding their arms in a groupwork.”.... “Eye contact is there. If questions are raised, they are raised within the group, clarity comes from certain groups, and the group leader is here with them. And the group leader will make sure that they move, they keep moving and not staying in one pace, in one thing for a long time. So the group leader is to check that, to mention that, they are moving like getting to it, every time.”

HLP3: “(*Whispering to the other teacher for an answer*) *U* implement-*a intoni*?”.... “*Kaloku uba* group-*a* according to *ii* abilities *zabo,* then *kengoku into oyenzayo ubanike mhlawumbi i* activity, *mhlawumbi wenze i* worksheet *ne*, for *bona*, then.”.... “*U* encourage *i* participation *kubo bonke, uba* monitor-*ishe uba bayasebenzisana na*, monitoring must happen, then *uman’ubanika ne* registering that *wonkumntu uya* participate then *wenyule nomntu onga* participate-yo, *ozakujonga pha kubo ozakujonga into yokuba baya* participate *bonke na.”*

GNP4: "And luckily, *masithi* in an ideal situation, whereby you have got six groups and also six members in this group. What I have saw sometime once *yakhe yasebenza* you take one member from each group *bo* form-*isha* another group. *Ba, mhlambe, ba* sort, *bathi mba kwi* group. So each and every member, comes up again to the original group *yakhe, azosixoxela ke 'ngoku thina', ngokwakhe. Xa besidibene besikuyo* we have discussed these issues in this manner *oluhlobo nolu hlobo*. They were given the same topic, you see *mhlawumbi* you given the same task for the same topic, *uyaqonda*? As an original group, *nank'u*-group A, as a original group *nazii* task, *nantsi* topic *ezawu* discuss-*wa* today. *Bazi bazi* original groups, six members, then you take one member from each group, they form a new group, you one member from each group *ba*-discuss-*e* that topic."…. "Ja, the jigsaw, ja, *uyabona?* (*The interviewer knows it's JIGSAW, he tells it to the participant and the participant is full of laughter and smile*) Then they come again to their original group. So each and everybody, has got to report to this group because each and everybody was in another group."…. "*Xa ndizama i* groupwork *eklasini xa ndiyenza ne i* cooperative learning*, into endiqale ndiyijonge ukuthi, bayithande*, should be real, *ibe* realistic, *ndiyenze ibe* linked to *i* environment *ne* situation *abantwana abakuyo, ndingathathi into e* out of their world. This is something that is within their reach, *uyabona*? And secondly, making them understand *ii* rules."…. "Of each and every individual within the group. And, what should each and every individual input be? Ja, *uyaqonda ke*? And at, that takes an ample of time, *uyaqonda?* Because you got to make them understand, *ukuthi* you must cooperate, and you must work as a group, because these, the marks that you will be achieving *yona zezenu*, will be *zezenu nonke bethuna* and you must work very hard, *uyabona*? As a group, as a unit, understand *ukuth*i as group. Because sometimes into *endikhe ndiyibone mna*, mmm, even within other school, even within my school learners are placed *ngokwe* desk-*a."*…. "They think *ukuthi*, that seating as a group, they think that it's groupwork. It's not group work, you're just seating as a group, they are not working as a group. So I think it's some of these people, *ukuthi*, learners need to understand their roles in this group work. They need to understand what one should be doing as a group member, and how to achieve the task given as a whole, *uyabona?* How to assist *omnye komnye* as rule? And mind you, having it, 'assist not giving i information' because you need to assist, *banganikani i* information, whereby you find *i grrr*, find learners in a group, *umhlawumbi* one, *sikhabe sithi lowo*, okay *ke, akwazi ukwenza*, then *ayokwenza lo msebenzi*, *anik'abany'abayi* four, *uyaqonda*? As a group, must be giveni chance, *uyabona*? Assisting *i* lesson *umntu asebenze* even if it's something *encinci, uyabona*?"…. "So it's very important *bayazi ngoku lanto, uyabona*? And *bayazi futhi enyinto noba* practice-*zisa lanto ye* self-evaluation *ne* peer-evaluation, *esikakhulu, umhlawumbibayi* practice-*ze ezalento*. Even i form how to evaluate your work, within the group, *uyabona*? And evaluate within these members, and *babe* realistic *xa bezi* evaluate-*ayo*, *angabine nto yokuba lo* it's my friend I should give *i* mark, *uyabona*?"…. "I think another thing *kulento endiyiphosileyo*, you know your learners in your class. You know there are higher-achievers, moderate-achievers and those that are, have slow-learners. I think it is also very important how you group them."…. "*Uyaqonda*? Take time, they are slow-learners. At least mix them, *uyeva*? High-achievers, moderate-achievers and through, within the same group so that they can assist each other, you mix your groups, uyaqonda ke? You mix your groups and rotate them. Not to have the same group from January 2013 up to December 2013 people belong all in the same group, mix your group. Look at how they are doing things, okay, you take one from, *umtshintshe umsekwenyi* group, *uthath'omnye umtshintshe*, *nditshubana* mix them according to *i* performance *yabo*. So it is very important *ubana ubakhuthaze, bancedisane, ukuthi*, okay, you pair *owubabonayo ukuthi, ubani* is a slow learner, *lona no* at least there is higher thinking. *Umhlawumbi noba kule* group *bayi* six, *ukhe uthi* you two you will be working together, you two you will be working together, you two you will be working together, in this task, *uyaqonda ke?* Then you report back as a group. Then *u* pair-*ishe,umhlambi omnye nomntwana, nincedisane, nincedisane. Nina kule* task your job is to do this, *nina kule* task your job is to do that, *nina* is to do that, then you report to each other, at least after you have done your task, pairing them *ngokwe* abilities *zabo, ja, uyaqonda*? *Ukwenzel'omnye akwaz'uncedisana nomnye.* As what is important, is to let learners have patience *bayazi uba*, because *uba mhlayimbi abanye mhlawumbi* accept people *lula,* they are not taken *ukuba ayapho ukuba kutheni ungayi* understand-*i lento. Kufuneka nabo bayazi babe* patient *kwabamileyo ubana* these are the inputs *kufuneka bezifundile*. To be patient *xa usebenza* within as a group, *uyaqonda*? And *ndihlala ndiyitsho ke mnakuba ndibhale ubana* 'There is no I in a TEAM', working as team, *u* team is spelled TEAM, there is no I in a TEAM, *uyaqonda, ja*."

SAP5: “First plan the number of groups. Democratically allow learners to elect a leader and a scribe. These (roles) should rotate everyday. Give clear explanations on what to achieve and specify time limit. Give time for reporting and feedback. Round up with a generalisation and/or adoptions on the lesson.”

FGP6: “So, ndici’mba mna, for me, ukubohlula in groups nalapho, teaching, u visit-e each and every group. Ungabohluli babezi groups then you stand in front. You visit each and every group to see intoba there is *imanyelwe* and.”.... “For instance, when your learner, from the beginning of the year, ne?”.... “When your learner come to your class, each and every one in the group needs to have a role, there must be some much but it doesn’t have to be a central thing. The roles must rotate so that each and every one should know the responsibilities of each portfolio, do you get me?”.... “It might, whereas they are working in the group but you need to consider individual participation, because some may leg knowing that we are going to get whatever the others are getting, ne? In order to monitor even the other are gaining, ne, in order to monitor that, you need to move around not just let them work as a group and move around try and pick-up the, the problems as they are going along, who is doing what, who is doing what, and how? That needs time, but you need to try and make time.”.... “Mmm, we use different strategies as people, you might have your own way of doing it, I might have my own way of doing it. But as I have said before I group my learners according to their abilities mix the abilities, it doesn’t have to be.”.... “The same, you group them according to their abilities, appointing leaders, explain, I explain to you as an educator you need to be hands-on. Whereas the learners are working on their own, but you need to keep monitoring them; don’t just let them do their own; you need to be part of it.”

DDP7: “I divide the class into group of six. Each group has a leader. Each group member is assigned a task but each member can help one another. Time is set for the completion of the task. Weaker learners are distributed in various groups. Each learner is encouraged to be responsible for his or her task. Notes are taken and discussions are made.”

2. Tell me how you divide tasks and resources during group work so that all learners are kept on task. (Probe e.g. What are its advantages? What are its disadvantages? How can they be overcome?)

FGP1: “It consumes a lot of time, and, because it needs a lot of preparation, even, consumes a lot of time even when you are actually doing the, the group discussion. Sometimes it doesn’t necessary means that your, your aim *okanye* your goal they may be *ntoni?* they may be achieved. You find that, it maybe a fruitless endeavour throughout in that whole discussion. Your goals or what you think that you were going at the end will become nil.”.... “And also you’ll find-out *intoba* even if you did explain to them what you want them to do. Even maybe the whole class not also one group, they may think that they have understood what you want them to do, but, you’ll find out that they haven’t even understood, although the discussion is going to take place but you find out is going to another direction, which means that was a fruitless endeavour, the that means *ke ngoku*, the teacher to round-off, also maybe you may not, you will see that this will not help. Then, go back now to the telling method, of which now your learners you want them to drive to direction, of course you have given them the chance to explore. But at the end of the day, now as a teacher, now you find out *intoba* now for me to be able to do this maybe I need to use ninety percent of the telling method, although now you will be asking question to the right direction but you will find out mostly no, you’ve gone back to the other method.”.... “There may be, there may be some disadvantages as I said that by leaving everything on the self, because they are still learning, it’s even to us as adults, even if we go to *ii* workshops for instance the tutor will say that as this group I want you to do this and this. You will find that i interpretation *yethu* maybe totally different from what the, the tutor is giving us. As a result even if you’re dealing with *ii* adults he’s got to go around to find out i*ntoba,* are we on the *ntoni?* on the right track, so just by throwing it to them because they are still young. So it’s also is giving a disadvantage you may think that they are doing this in the correction, in the correct, that is why I say some task for instance that are easier or maybe they have dealt with in the previous grades for instance but they can do that on their own just to find out *intoba*, they do understand. Maybe you want to find out *intoba* they do understand this you may just give them. But generally, they do need *i* guidance from you.”

SIP2: “The task that I gave them they range from not so difficult task to complex task. They range from simple to complex, sometimes they go out to a nearby service station, SASOL garage to find some information, they have to go to a local butchery and find something which they have to bring containers, millilitres, grams and then, they all have to do conversion of one unit to another. So, sometimes I give them a task that I know you have to go back home, get that information, and then apply that information in the step when they come together.”.... “So each and every one of them in a group, ultimately have a task to, to, to, do. If somebody is going to be a calculator for an example, one person will be the calculator, and another person will make sure that we have the right operations where we need them if it’s the need, it need to be the multiply, thus they multiply one other person will read and understand clearly the instruction and what need to be done”.... “The resources, mmm, they do have calculators from the school, they do have text-books, mmm, where we are going to look at examples, to get procedure on how, mmm, how to solve some problems and, mmm, a picture that they have, that will hang on the wall so that they keep reminding themselves, and if they need any book up there as the educator to make sure that they get what they need because, mmm, it will honestly help them to achieve what they want and they should also discuss amongst, what do they need.”.... “Then, conversion, converting litres into millilitres, so they bring the containers, they do that in class and write the findings down. They have two litre container bottles, they have one litre, they have five hundred millilitre, then they can use water to say, okay, this is five hundred millilitre, how many times does this going into a litre? And then, they do all that, and they write it down, and then they can derive the formula out of that.”.... “So I like to, I like to allow them to do it themselves and write down what they found and then from that I write a theory on the board that they can use in different situation. But I have further going to make sure that it’s correct, what they have done is correct.”.... “So we derive a theorem from what they did and write it there and allow them to apply it on different situation but firstly what is important they do it practically. So we do keep some, some things that they can use, sometimes the school we allow us to have to use containers or something else from the science department and so on.”.... “So, all those things will be discussed, and the one holding the calculator will make sure that they get the correct digit, you see. So, that is how I conduct it, each and every group I want to make sure there’s progress. There is progress so that I keep all of them moving towards achieving at times.”.... “The disadvantages are, there will always be those learners that are shy and don’t want to talk, they won’t want to participate, mmm, because this is always problematic with the group work, that the, especially with bigger groups, there will be those that are not part of it, they won’t be active because there are others that are working. So, one would find out that they have got nothing to report back, because everybody have done what needs to be done, you see? So, that’s why I keep the groups small and, and few numbers so that everyone will get, it helps up to do. But even then, some will be defiant as a result to, to, on top of that.”

HLP3: “*Ewe, xa ndibalantuke pha kalokundibanika, mhlawumbi bathi* work together, *mhlawumbi ndiba* group-*ishe* in *njengeziny’i* group, *mhlawumbi yi* test, *ndibanike* loo worksheet, for *ba eee basebenze ngazo, mhlaw’umbi ndibanike* like *into? ii* questions *nee* activities *uyaqonda* for *ba bazosebenza ngayo yonke la nto*.” .... “I think i advantages *yi ababantwana baya baye ba* gain *babe ne* communicative skills *ufumanisek’uba ngoku bayakwazi ukuthetha uyaqonda lanto yoku* communicate or *ufumanise babanazo ne* skills *ezi ngoku, yi* advantage*. Ufumanisekuba nomamela oku bayakwazi bethetha*, each other *xa bethetha kwezi*-groups. *Baphinde nokwazu* analyse something *njengokuba ubaniki nto ba* analyse *kuba bafunda kwakwabanyabantwana ukhubone*. I think no *solva ii*problem *ngokunjalo bayakwazi ukhubone*. I think it’s something like that. *Ne* grouping *ke, ne* group *le, ukhuboneklasini xa bengekho* sort of *ba bayebangxole*, but *ufumanise intoyokuba xa bethi* work together *banayo i* discipline *kwakulento bona kuqala kulento bayenzayo ne* attitude.”.... “Like i positive attitude, *umntu azinikele kulento*. For instance, *omny’umntana mhlawumbi angayi* understand *into ethile*, but *ngokudibana nabany’abantwana kanti nabo bacaciselana naye afumanisekuba tyhini kanti lento ihamba elihlobo atsho ku tshintshi* attitude *yakhe ayithande, atsho ayazi kengoku ekugqibeleni, ewe*, I think.” .... “*Hayi, xa ndijongile*, I don’t think *inayo, mmm, ayina* disadvantage, because *iluncedo kakhulu*, it help, it’s fruitful because *imnceda kakhulu umntana, uyabona? kula nto babesenzisana, bencedana* each other *yonke lanto.”*

GNP4: “The scene, it will happen here, okay? Now ii task sizenzile, they are giving me ii task ne? And also kengoku ubanike i evaluation noko ke, please, maku evaluate-ele ukuba kulomsebenzi bendikunika, how much have you done wena and also i group iku evaluate how much really have

you done? It should be discussed as a group and yaziwe ibeyi-norm. Ayazi ngoku, heyi, I must work hard, because my work, my participation will be evaluated, uyabona? It should be a norm ke bhuti yaziwe lonto yi-group, and it should be known as a class futhi, ja, lento uyisayo, uyaqonda? My participation kwi group, Ja."…. "Uyabona? So those are also the challenges esinazo ezawubangeli nto yokuba nokub'ufun'uku implement, ungakwazi uku implement-a, uyabona?"…. "Mmm, as I've mentioned before you know how your learners perform. So, if you have i task, you know, ukuthi, this task needs abantu abanjena, needs abantu perform-a in this level. So, I think dividing i task should be according to the performance of your learners. You cannot give ii learners knowing ukuthi, heyi, le task, hi i they won't, it's a tall-order kubo, they won't be able to achieve. But, yet again you must not undermine them. But yet, uyabon'uba, it's very, senditsh'uba, i i i it's got ii advantages and disadvantages because you can say, okay, abantwana this task I'm giving them it's a very tall-order, bona, but yet they can surprise you and achieve the task, uyabona. Nditsh'ubana, so sometimes, nditsh'ubana, it's very very delicate, le issue ye task uyaqonda?"…. "Sometimes, nobanika i task whereby they will be demoralised yile task, ufamanise int'okuba, heyi, they cannot move, uyaqonda? So, it's very delicate, uyaqonda? I think, which is, depends on that situation i task yakho, uba, how triple and how does, ngoku need to perform for i task yakho, to carry i one-fifty whereby you will be dividing i task ngoluhlobo, uyabona? It depends sometimes on the task that is, needs to be, what needs to be done, and how do you perform and also the resources, if possible, can share them equally among the group, I think you should share them among the group." …. ""I think i disadvantage zoba umhlawumbi, you say this task, okay, is meant for u group A and this one is meant for u group B, because u group B performed in this manner, I think I should give them i task that is lesser than u group A. I think is very dangerous, I think the way you divide your task, at least you should have a part whereby is a little bit tough, and a part whereby it's achievable, uyaqonda ke. Ingabiyi something obon'ubana babone le, even the other groups uba le i group inikwe something, bayibon'uba iya underperform-a, bayinike something just nje abakhathelelwanga. Abanikwanga something that is challenging to them, uyabona? It is sometimes, lay an example int'uba, sometimes give them ii task azi challenging even ngokubabonayo intobana, ubani-bani baya underperform-a, le group. They can surprise you as come up with something very brilliant than i group ubuyithembile unqond'uba u group A, uya uya, hayi uyahamba nayo lento. They can come up with something brilliant, uyabona? Babethe naloo group bebesithi ine high performance." …. "I disadvantage, uyabona? Unlike umntana, masithi umntana abafunda kwi Model C school, uyabona? Most of i parents are literate kwi Model C schools, they support their learners, everything. So, even, part of the, hence umntana uhambu-hambu ntoba bakwazi basebenzisi ilanto bangene kwi parents because of i support and the environment asebenza kuyo. Unlike thina from i poor socio-economic background."…. "I think we should look at the strengths of i i learners zethu, look at strengths of i groups really. Then capitalise on those strengths more than looking at their weaknesses, you see? If you can check and find out what does their strengths? What else can they do, then capitalise on what else can they do, like ufun'ukwenza a practical, mmm, example, mmm, umhlawumbi masithi you are teaching something about imali, uyaqonda? Sometimes, just talking about imali ungekho practical ngayo, i i i abany'abantu talking about imali in numbers, that process mhla'mbi iyababhida, jong'umhla'mbi kubantwana abancinci. But xa besebenza ngemali, besenza lonto leyo abanye bayi grasp-a msinya. Nditsh'uba we should look at their strengths and how can these strengths be lanto? How can these strengths be lanto? Be utilised kule task and how can they implement kule task i strengths zabo more than looking at what they cannot do. We should look at what they can do best, ja!"

SAP5: "Assign group tasks of varied levels of difficulty. Swop the tasks. The leaders collect resources."

DDP7: "After dividing the groups, tasks are distributed to them. Each member of the group is assigned a task in the project. Members of the group help one another to perform the tasks."…. "The advantages are that each learner gets peer support and this gives him or her confidence to perform more."…. "The disadvantage is that some group members may rely more on others."

3. Talk about how learners play an active role during group work. (Probe, How do you deal with off-task behaviour? How do learners share knowledge and resources? How do learners teach and assist each other?)

FGP1:"Okay, what I do, mmm, at the beginning of one has a chance to be able to talk and not fear others in the class, for instance, I am in seven one and the period has ended, you know that, for instance, the teacher hasn't come for the next period, so we are rounding-off. So maybe, I may be late for this period, so what I usually do is that, every learner on a particular day has got *i* role to play. So, if I am not here at that particular time. If they have i homework for, they been given i homework, they take turns, because the year, aaah, even throughout the year, is for me to build i confidence yabo so that each you will find out if you say just throw into them, you will find out *intoba*, there are those learners who are very good, they will always come and set ever to, on their own, everyday, it's the same learner. For me to build the confidence even for others so that when it comes to the, the discussion method, ones should feel free to say what she wants or he wants to say. So, I give the role that, and they are fitting in the groups. So today it's Monday, the first person if I am not here, they've been given *i* homework, he knows that he's got to be infront, first of all to tell that the maths period has started. So, if they are busy with any other homework for any other teacher, let's put our books away. So, he is in control in my class, in my place is in control for that, for today once I'm not here. So, they shelve all their book and they take out their homework book each group. The try to look at their classwork book to find out which learners hasn't done their home work when I come here, so-and-so haven't done *i* homework or hasn't completed *i* homework. Then, after that they discuss, he goes into the board he divides the board and writes the date for himself, correction and it becomes*, ibe yintoba*, we are going to do *ii* corrections, first question for herself. And it doesn't mean that, for instance, we do have those learners that do, do not, that underperform. Even them they go there because it doesn't mean that. So when that, when you ask the question, he will take practise that I am writing. So when you ask the answer, even they answers the question, they do that as *i* rules. You don't ask *ngoba* ngokuthi simply hands-up, simply put up."

SIP2: "And one other thing before the groups are given their task, it needs to be clarified, the code of conduct, each and every time that the kind of conduct that you don't allow in a group, so that all the learners can be aware of what needs to get the heart and those that do not have the heart."…. "Now, the way I do it, because each and every group, I know the task I gave to each group and I know the steps to be taken to achieve the task. So, I intervene and say so-and-so this is what you have to do. So before the group can actually work, this is what you people there information you must go and find out, then answering it by myself then they have to go and do it and bring it to them. Then the group can start working, the, the rest of the learners in a group can do their tasks. So, it, it, by so doing I am actually forcing this problematic learner to do something because it won't be easy for the rest of the group as learners to make, mmm, too hectic, sometime they are afraid and to, instead of allowing the whole group to be delayed they would rather prefer somebody do this, they do that, they get the information and they do the work. What these problematic learner, isn't let do now, so I come-in because I know the problematic ones, I come-in and say 'this is what you will be doing!' And bring the information to the group and then you may not practically answer that because you have done your task, brought the info into the group or the resources and everybody devours in what you brought into the group. So that's how I deal with the problematic ones."…. "Mmm, the knowledge is shared among the group because if they have to work on a particular concept, they must know something about that concept. And how they deal with it has to be discussed in the group. For an example, if there are, if we are, if we are at, we are at fraction, say we are talking addition of fractions, mmm, one person, I can start back at loaf of bread and the whole and divide it into halves and quarters, eighths because during lunch-time hence are they to divide the quarter they know. They know a loaf of bread that it's whole, they know the quarter, they know the eighth and the half. So, they bring all those in quarters they make it a whole, how is it made a whole, mmm, for quarters make-up a whole or eighths and all that. So in that way they share the knowledge of fractions, they know a quarter, they know an eighth they know that if you put four quarters together you get one whole. So, that is how they turned to share knowledge about equivalent fractions for an example.

So they will know exactly that what is an eighth of an eighth will give you in one quarter? Okay, a quarter and a, probably give you a half, how do you get a whole? You got to have about how many eighths, you going to have eight eighths. And then, a whole is made –up of eight eighths, a whole is made -up four quarters, a whole is made up of two halves. So, that is the knowledge they will share, the knowledge they will have, merely by looking. They just look at the whole and note that alright; okay this is a whole, now this whole can be look at in terms of halves and into two halves. Now, if this whole has to be looked at in terms of quarters it's one, two, three, four

quarters; if this whole has to be looked at in terms of eighths, it's gonna be eight eighths. Then that is sharing knowledge in equivalent fractions. Also, they will know that, okay, two quarters are actually equal to one half, you see? So they can share all that and clear around with those fractions."…. "They don't move all at once, in a group there are those that will be very active and wanting to lead the whole process into groups, say if they have to put together a whole structure. Obviously there is somebody who is going to jump into that and want to do it. So, in that way they tend to influence the knowledge of one another. And also my kind, my way of questioning will lead them in such a way, one will ask questions and one of the group members will answer all or will want to answer the question. And they have a whole in-front of them to prove or to, to try and work around the answer. Okay, how do we get, if I say for an example, how many eighths are there in one half? Then, that is a question, how many eighths are there in one half, then all of them will be proving around, and they will try to put it together in one half, in one half, and how many eighths will be equal to this one half? So, one of them will be leading them in actually doing it and then that is how they share the knowledge. But the educator is not always there to make sure that in the second question the answer comes from a different person, yes. Sometimes, within that, within that group you'll find that one is leading and there is a quicker one who keeps coming up with the answer."

HLP3: "*Mna xa ndijongile ababantwana baya* improve-*a, kuqala* you will find that at the beginning *abantwana bebenga* progress, *ufumanisek'uba bebengekho* that much, as *babethi* work together, *baya* improve-*a* i knowledge *yabo, ufumanisek'intoba i* information *ngoku, nobebengathethi olaph'e* groupin' kuthetha yena i improvement *ziyabonakala baba* active. *Ufumanisek'uba kuqala bebe* passive, *kubabebengayazi nokuba kuqhubeka ntoni na*. As *ba bethetha* with each other be socialise-*a*, be communicate-*a*, *besenza yonke lanto leya, i* improvement i*yabonakala, uyaqonda*?"…. "Yes, *uyaba* discipline-*a kaloku*, for instance, if *umntana umnika i* some work to do and then *eze umsebenzi angakhange awenze uya*m discipline-*a* like *umnike* more work within the period of time *or ubiz'umzali wakhe*, told him *lanto leya, ubiz'umzali wakhe, u* deal-*ishane naye uzamubeka i* measures *zakho zobuzali uba* if *umntana xa wenza ngohlobo oliba kuzakwenzeka u* A, B, C *si* discipline-*angalondlela*."…. "You just give them something and then *ubaxelele ubaxelele into yokuba mabathi* work together so that *bazokwazi, ubafundise* how to share, *ubanuk'umsebenzi bathi* work together then *bayi* present for instance." …. "I sharing *kaloku* is very good *nje*. *i* right *intoyoku* share-*isha*, like."…. "*Eee*, *xa ubon'umntana ukuba akakho* that much for u share-*isha*, you come up, umthathe, then *ulantuke(A hesistant phrase)u* discuss-*e naye. Uyaqonda? Mhlawumbikengoku uzakuza nee* problems *zakhe, uzawuza nee* problems *zakhe* whatever, *aphek'lantukeni*. Then *kengoku, uzamukumbonisa kengoku* how to share, *'ba* you will find out *nyani umntana ukhule yedwa kwakokwabo akakwazi ku* share-*isha kwantoni-kwantoni-kwantoni.* But *uzam'umbonisa uba indlela* yoku share-isha *uba injani*, *kufuneka besebenzisene njani nabanyabantwana, uyaqonda*?"…. "Cause ke *nyani basuka kwii* background *ngee* background. *Abantwana bakhule ngokukhula, uyabona?"…. "Eee*, to sharing, *ufumanise kuba abantu abathethayo zeza* 'gifted' *neza* 'mediocre'. *Abany'ufumanisek'uba kodwa kweliny'icala, kodwa baya* improve-*a. Uba ibingekho le* cooperative learning *ngeku* out. But *kubikhona kengoku ufumanise ukuba ikhona pha na phaya, uyaqonda? La nto?"*

GNP4: "Mmm, I think as a teacher, you need to move around if i task yakho yilanto, in your class you need to move around as quickly as possible kwezi groups." …. "And look what is actually taking place, because you will find sometimes there is one who is dominating these groups. And you need to handle that but professionally. Because, sometimes other learners assist to learn, they can dominate i group, and want to do everything ngokwakhe yonk'into ne resources ufamanisek'ubana akafuni kuzi sherisha within the groups, uyaqonda? So, you should be always moving around the groups looking, and they working, as the work is going around zona. And yet again njengokuba mhlawumbi there's one group member e dominate-ayo."…. "Others are just spectators *(Somebody is knocking at the door*). So, bendisathi ke, as a group ne, you should look ukuba, other members want to dominate the group, kubekho ii spectators ezifumenenyiw'apha. So, you should guard against that, you should let everybody work. And yet again guarding against that you should be professional, because omnye once mhlawumbi uzame ukumcebisa no, thath'abanye uzaba reserved. Angafun'uba selfish state bakhe, as really, anganiki ezinye ii group members, aaah, ebedlangokutsh'ubana ngabantu abangxamayo abenza izinto, they want to do things, they want to see things. But we should try let them know, ukuthi, they should let also for others zi participate kwi group, bangenzi abanye babe zi spectators. So, everybody should be involved to guard against that, uthi make sure everybody is working. And assign ilanto,

sometimes batshintsh'i-role within the group. Ingasoloko umhlawumbi i- i- u- 'chair' okanye somebody who is going to be umntu omnye apha e group-ini isolok'ingu treasurer."…. "Ja, they should revolve within, i i ii-roles, they should revolve around ii group members. Today ibengubani o lidisha le group, today ngubani oncedisayo, i spin-e. I roles zabo, they should rotate i roles zabo, uyaqonda? Uyaqonda? Bangasoloko kukho i-role enye, kulokho ehlelinje i role enye. And also reporting as a group. Even those that are shy, should be given i chance to go and report, ingasoloko ingumnt'oyi one. Reporting like, group work, reporting, the other group, ingasoloko ingumntu oyi one, uyabona? And also sometimes you don't have, izake, if unezi groups zakho, masithi you've got these groups."…. "i sharing ye groups sometimes ayenzeki genuinely because people into endayibonayo ebantwan'abaya they don't want to to share i information. Others, if, ba just giving information kubantu int'okokuba babhale nje, babenento abayenzileyo. Don't share information for ukunceda umntu ayi-understand-e le concept eyenziwayo, either they don't want to share or they are just giving i information ukuba umntu kufuneka abenento ayenzayo kwi sharing information. And also i sharing of information sometimes even if yi group work sometimes yona, mmm, iya hamper-isha, ne individual performance. Sometimes there are times when you think that, umntu azi perform-ele individually. Like, if you are to handle i final exam now, hayi, akukho test, uyabona? So, mhlawumbi lamntu ebene interdependence okokoko, mhla'mbi kengoku, kengoku."…. "Okay, I think, mmm, learners sometimes learn best when they learn from their peers. The reason I'm saying that is because they can be asking ii-questions from i lanto peer yakhe and in a relaxed, lanto, manner. And also, akana fear yokuthi mhlawumbi u tishara ambuz 'imibuzo, lemibuzo uzaphoxwa okanye whatever, uyaqonda? So, u kulula uku express-a ne peer, kulula ukubuza nezinye izinto umhlawumbi ebengenokuzibuza kutishara. And ne peer yakhe izi explain-a lula kwi language azayi-understand-a kwakunye nakwi situation azayi understand-a, uyaqonda? And futhi kuthi sometimes learners learn best when they are playing. Even, even nokuba seyiphumile i group, sometimes umxelele e-group-ini sometimes umxelele e group-ini njengoba isebenza ngale group, even when it's the break whatever. Bayakwazi ubuzana izinto ebezisenziwa eklasini njenge group work ba understand-isane. Nditshubana, it's very, ukuthi bafundisane as a peer, and I think i peer sometimes is more effective than a teacher."

FGP6: "We cannot control the behaviour of the learners fully they always, kids will always be kids. But it goes to a point where from the very onset you have class roles, from your class roles use in your groups you groups you have group leader group leaders which will report back to you because you are moving from one group to the other. But then whilst you are faced with the other group, the other group might be way off-task But the group leader apart from the fact there is a group leader in each group he needs or she need to maintain the discipline in the group If then it's beyond control it's them who get that him or she might report to you as an educator. Coming back to what I've said learners can discipline each other."…. "They can discipline each other, why do I say so? They know that this is a group leader. But the group leader needs to know that, because he or she is a group leader doesn't mean that she or he is above the other but it's just that he or she is there to maintain the discipline. You talked to your class leaders you are going to deal with such and such kind of people ne? So for instance I my class is five four, ne? Grade five pupil. In my class my leaders were doing is one, I bought them a packet with stars the stars."…. "Those decorated stars, what they did one I would tell them give members on your group and in order for me to recognise your group and give the whole group a star. You must see to it that the members of your group are well behaved. They, whenever they leave the class they have come in and stuff, ne? You need to achieve these levels, ne? Even with other learning areas not with only my learning area, I will get the report from you that this is what my group has achieved. Then I do an overall and give as that was the group, then that particular leader doesn't want to be on the bottom of the list, do you get me? He will always make that 'keep quiet', 'never do that, so that we can be able to get the results' (*participant whispering it, likewise)*. You, you need to bring about the ways of making them compete, ways of making them want to be the best, so if you do that they tend to focus more on the positives. And, we all know there are those who will alwaysbut it will be only one in a group of which the lot are striving for the best. So that one will end up saying, confirm, 'well I'm the black sheep of the family' so let me just."…. "Oooh, they would do because it was not a matter of trying to entice them. It came about later-on because I could see that they are striving so it was a matter of 'putting more petrol into fire'. There was already fire but I wanted them to reach their best ability because I knew that there is something in them but it just needs to be (*Participant using a sign language showing to lift-up*)."

4. Tell me what is your experience of the impact of cooperative group work for learners' academic performance? Tell me more. (Probe, What are the 'gains'? What are the 'losses'? Why? How they can be overcome?)

FGP1: "Okay, as I have indicated earlier that, no method may be hundred percent, per se, we've got to, they've got to complement each other. But specifically now because *ke ngoku* you are asking specifically on *i* cooperative teaching method."…. "To me it may have *ii* positive effects on the sense that, we, it's not only about the subject matter that is why I usually say to them, as an educator when they see me cutting to the cloud, they must not see me as a maths educator because at school there are various skills that are being *ntoni?* taught on them, yes, so they must not just see me as a maths teacher, because for instance one other teacher *o* resign-*ileyoaphaufika kwam*, because I'm from, *i* twenty years I was at high school *ngoko*."…. "They gain i confidence, secondly, they share *ii* ideas."…. "So, she said to me, I like the, your approach because we are having a problem of *ii* language, the writing of our learners is very bad, *i* reading of our learners is very poor, so I use because what because she was showing what I was doing is that as teachers you just come into the classroom thinking that it's about only numbers in order about to work as a problem. Sometimes we do open the textbook and say for instance let's read the 'heading' in the textbook, go to page so-and-so they read the 'heading' they read the 'introduction' which means at the same time I'm killing two stone. And as I am moving-on and they are reading that paragraph for instance you'll find out that this learner is unable to *ntoni?* to read. So it doesn't mean that I use it every day but it's also ntoni? helping them. And sometimes when you are rounding for instance a lesson which needs definition, sometimes it's easy to write on the chalkboard or I can photocopy and they can paste on each other or on their workbook. But sometimes what I do let's say maybe three definitions whether you to write on sentence I give them orally so that they may be able to write on their own, as much as *intoba* when I am giving the sentences to them but I spell it cause you find out now some of them they are *ntoni*? they are struggling . So that is why I say that the method although it's about the subject-matter but at the end of the day learners are gaining more and that indicated the communication skills, the confidence, the listening skill, the leadership skill, *i* respect, to be tolerant also towards others because you got to give a chance to someone to, to someone to speak and also you need to respect *ii* ideas of, from others because they know that they cannot *ntoni*? talk at the same time. But again I have already said that it's also time consuming, and it needs a lot of preparation from you teacher. And also it doesn't mean that because you have given learners to discuss on their own, they can just *ntoni?* relax, so it also needs, mmm."…. "i control and also if we start it early, early as possible our learners when they go to upper classes they will know that when they are here at school they have come to *ntoni?* to work. So it also build them to know that i discussion is not about playing it's about people to become *ntoni?* real."

SIP2: "So, if they do more tasks in a lesson, they get motivated and want to do more. So, that is where I give them home-work, I give them more task, because I can see that, okay now they understand the how-side to, maybe they can apply it."…. "They get, they get recognition and then, mmm, in terms of marks because we work in the classroom and if it may sometime it's in an informal task, it's just an informal task. So, if they finish earlier than the others, they get recognition from the classroom and then they are given more task."…. "Mmm, if I don't intervene, I end up with a situation where, mmm, one learner in a group is kind of leading the whole thing or giving all the answers. Now, in that way it doesn't impact on the other members of the group. Because one person is actually coming up with the answers, then what I do, the ones that I know will have most of the answers, have to be group members and keep asking questions and allowing different people in the group to come up with answers. Then in that, it has a very positive impact because if one learner gets a correct answer and they agree, the competence develops in that learner, and the other learner also is given a chance to answer and the confidence develops in that learner up to a stage where every member as a group, can actually be a group member, and to know exactly that I have to give."…. "Mmm, from a group, it is easier to learn concepts because these learners have their own way of communicating, and making input, giving clarities to others, so they understand it better when they sit together in a group, they can, they can apply it, mmm, they develop various means to express themselves in a particular concept." …. "It can be time consuming because you have to walk around monitoring each and every group making sure that, mmm, from the various task that you giving to the various groups, each group is actually on the right track in terms of going to achieve what they

have to achieve. So it is time consuming, it, it needs lots of resources because they will be very, they'll be working, mmm, in a classroom of about fourty learners you'll have about nine groups, or about eight groups. So, you have to make sure that all those groups are not left behind. Otherwise, it will be a disaster if you have one group that has moved a long way with a misconception, and they arrive at the answer and think this is the right answer because mathematics is all about numbers, at the end of it you just get, you simply get a number. You may think that the number is correct, you see?".... "So, in my experience I have to move amongst them when they do the work, so that I know the resources they have are adequate, the information they have is correct, the understanding they have of the instruction is correct, then they have, they can, they can move. So it is time consuming and it needs a lot of preparation on the part of the educator because sometimes you find, mmm, a problematic learners that you have to deal with them, make sure that you deal with them and assist them properly in so doing."

HLP3: *"Ne* pass rate *ufumanisek'uba i* high *ngoku, ufumanisek'ukuba bebe* fail-*a kuqala*, the more *besenza ii* problems."...."Like, *kaloku, mhlawumbi uyaba* assess-*a, njengokuba behleli nezi* results *zabo, mhlawumbi* you're given the activities or *ke no* test-*ana* short term or class test *ndiyaba* assess-*a*, *uthi ke ngoku xa uba makisha, tyhini ubani-bani ngu* 'through' *akakho njengelahlobo liqalayo.Mna ndingababona ngolohlobo ngoba* assess-*a* for *ba tyhini sebe* improve-*a* mos. And then you give them another short test *ngeliny'ixesha* and then *ufumnisek'uba tyhini* as *ba umanuba* assess-*a* after *bemana ubanika another eza* discussion *zabo, neza* sharing *zabo yonke la* activity *ngelahlobo umana ubanika zona ufumanise ukuba baya* improve. Like *jonga* for instance sine camp, phakula camp, *ababantwana bahlala pha, batya pha, bafunda pha, niyaba titsha pha*, but *ubakhona ilantuka umehluko pha*, rating yabantwana*, bapasile almost bonke, abangapasanga babethi* supp *qha, sendisitshuba lanto yoku* share-isha *bahlale kunye* one *ndawo bangabi pha babelapha*, *ingqondo zabo neza* study methods, *okanye yonke lanto leya iyabanceda, uyaqonda?"* .... "But you'll find that *mhlawumbi kulo* up and down *ba* improve *kwi* test *ethile* or *ufumanise kweny'i* section *mhlawumbi unalo* problem-*anyana* but *kwenye u impruvile, ukhubone?"*.... "*Kungacaba mhlawumbi zonke baya* improve-*a.Ufumanise uya* improve-*a kodwa kwi* section (*Participant speaking with someone at the door) amane*'improve-*a uyaqonda, mhlawumbi kwi algebra uya* improve-*a, ufumanis'ukuba*, ooh *pha kwi* geometry *noko uyazama kancinci*."

GNP4: "I think it does impact, because it has a positive impact, because learners learn through i cooperative learning, uyabona? On an ideal situation whereby everything run smoothly, and everybody is playing his part in a group, enhances i academic knowledge ye learners, uyabona? If, and everybody work and everybody mhlawumbi impart as a group member, then i academic performance yabo iyenyuka."...."And also, I think, mmm, eny'i-gain is to have, i i to to prepare them for different perspectives because when you have a group, it means you have got to listen to what other people are saying. And also respect other people's view, respect other people's perspectives, you see? Because as a group, you worked as group, you need to listen to what other people are saying and the merge that information with your own perspective with your own understanding. And then comes up with one common, and one one one common perspective, andithi? Is preparing them for i understanding of other people, and also respecting of other people's ideas and also ii perspectives zabany'abantu. So, imenza lamntana angabi shallow, akwazi ukuzijonga ezizinto from different perspectives, because as a group, if you discuss issues as a group you will find there are different perspectives within the group and within among other groups within the same class, ja."...."I think, I think i losses esinazo, I, zzzz, I think of higher academic achievers ne learners whereby ku stuck le group, and it's boring to him, you see? It's boring to him lento, i it needs to be, i, outstand, i something to schedule kwi situation enjalo, think nge situation enjalo, uyabona? Ukuthi explaining, hence, and understand, kuye mhlawumbi it's not you think, it's boring to him, ukuthi, us understand this concept, why don't we move on? Except , okokoko sime apha, why don't we move on? Uyaqonda? Beacuse we are putting fact time and again, nditsh'ubana, I think these are the losses ezibakhona, e- ku, kwi help learners ezine kwi higher." .... "The environment has an impact, uyabona? Because you cannot take away abantwana, the le le environment bakhula kuyo, bahlala kuyo, uyabona? For instance, ubabone enyi learners ngoku, they don't have i parents abazi support-ayo, some ezinye ngoku kudala sizibiza i parents uba khanizosi assist-a ebantwaneni benu. Abazi kwa ukuza, so akayazi nokuba makathini umntana for that matter, uyabona? Nditshuba i environment akhulela kuyo yenye ene impact."

SAP5: “Learners learn a great more and are free to express themselves. They hardly forget what they teach each other.”

FGP6: “i cooperative learning it has a positive impact I can say. Why am I saying so? It is because as I have said before, these learners come from different backgrounds, they have different learning styles, and they have different abilities. So, for that learner who is under-performing, who is an under-archiever being in at, oh, being at, used to this learner who has some sort of high-ability, this learner plays a role in trying to pull this one to the level though it might not be, be pulling to the level but you will find out that as learners one might be able to, ‘see *maan* that, *u* so-and-so said this, *u* so-and-so explain that this is that, instruction instruction when, no *maan* I can remember I didn’t know how to deal with this, but *u* so-and-so bring an idea of how I can tackle it in an easier-way than what I.” .... “With the groupwork as I have said before peer teaching is that thing e wrong it does have a positive impact on them because they have the same level of understanding I can say, their mind work in a certain way.” .... “They have a way of explaining to each other, for instance, as an educator ne? There might be term attributes based from my lesson plan of which they might not be familiar with but as an educator I need to use group term but with them in that group they are able to ‘*no maan’* for the educator says it’s like this, it means this, something as an educator you might not have been able to clarify, do you get me. For instance, a typical example, we are talking of i (*Particiant is thinking*), forgotten, but when one needs to guess what would come up next, you have this packet of ii (*Thinking*).”.... “You have this packet of ii Smarties for instance you are using it he you calculate the ratio ne? from these packet of Smarties One might want to say what is this ratio, but ke ngoku na ke with them they will be able to tell each other that, this packet of Smarties contains about fifty four ne? Then, if you have ten yellow eight whatever colour, then what will be the ratio of yellow Smarties in the packet, do you get me?” .... “Oh, the education system is not encouraging the learners to perform academically. You might ask why?”.... “Looking back at the times when ‘we’ were learners you would know that I need to achieve academically. If want to, I have to do this. If I want to, I have to do this. But there was always a bar for you, you need to go beyond that bar or aim for that bar. But currently with the education system that we are faced with, it’s not the learner who is suppose to reach for a bar, instead the bar is lowered to the learners level, do you get what I’m saying?” .... “For instance we would do schedules give the actual true reflection of the learner’s work. But there is this thing that the learner doesn’t have to repeat twice in a phase. In a phase the learner only have to repeat once then you move, you move him on.”.... “Yes, you push him. That means our learners are, won’t give all. Because I know at the end of the day I’m gonna be pushed At the end of the day it doesn’t bother me that u so-and-so has received *u* eighty nine percent *okanye u* ninety percent because at the end of the day I am going to grade six just like you.” .... “It deprives other people, because some people like their own space. There are people who prefer their own space during their own thing. So, it interfers, with their programme I can say because if you are that kind of person cause this is X and I need *i* space to myself, then you will feel suffocated that there is someone else who is going to interfere, and tell ‘no you are not suppose to do it like this, how about we do it like this’ you have your own ideas so you will feel deprived that someone else is to play a part in whatever.”

5. What are the ‘skills’ that learners learn during cooperative group work? Give examples.

FGP1: “Mmm, aah, the listening skill *mos* I explained.”.... “And also the communication skills, for instance, because when someone is busy explaining or sharing the ideas to the other one, is also being able to *ntoni?* to communicate that so-and-so, *i* communication skills.”.... “Ewe, because at the end of the day one should know how to organise data, one should know how to, then if I just give you collection of data it means you’ll not be able to know the skills*, ii* skills that as a role, even if I have to, you’d been that as a role but other learners must make it a point that, you’ve done it that way, and it’s correct, so that you are going to report.”

SIP2: “The skills that they learn from working as a group they learn to respect one another, they learn to listen when another one is talking, they learn to be, they learn to be detailed because when they have to do the actual task, that is where they focus on the details, to achieve the goal at the end of the task they need to have focused on all the details. That is, the, avoiding careless mistakes like, mmm, negative two multiply by three is equal to six. They know multiplication sign one, there’s a negative sign, they know exactly what needs to be looked at, you see? So, they

need to focus on all those details. And at the end of it, they need to be realistic and say, is it possible to get this kind of an answer, yes or no? So they have to go back, they have to go through all that, ja."…. "Mmm, also another skill that they learn out of a group what would be mathematics skills getting prepared, because if they are going to perform a task they should know up-front what is that they need to bring along, so that they can achieve what the aim to achieve. If they need to go out and do, and collect some information or collect some data, let's say, you need to do that. And they need to be, they need a good understanding and a good comprehension of what they had to do, yes. Instruction, they need to understand the instruction very well otherwise they may go off to something different from what was expected."

HLP3: "*Kaloku, kaloku ngelaxesha mhlawumbi ba* discuss *into omnye eyazi ino yokuba ihamba njani basayimamele, then baya* communicate-*a, abanye bayayimamela, i* listening skills. *Baphinde ba* communicate *ngela xesha ubanik'i* problem or *nala* interpersonal skills baya skills?"

GNP4: "Jaa, team work, listening to other people, different perspectives, handling different perspectives of issues, respecting other people's ideas. And *lantukana baya fundisa nalaa ntoni?"…. "Uyabona mos eza*also working as a group, as a unit, working as a unit as a group, because, mmm, in different you need to work as a unit, you need to work together so that you can achieve your goals as a group. You don't need somebody who will work individual, you need to work as a unit in order to achieve what you want to achieve at that particular time."…. "Like, as I said, sometimes as a group you need to rotate ii roles. So I think they are learning ii skills whereby abany'abantu they are developing i skills of reporting, ii skills of being a scribe, ii skills of chairing group, of doing task, you see? So, those skills, those are the skills that they are learning, because the task abanazo ziya rotate, azihlali ndawun'inye. So, they are the skills *abazifundayo* before team, being a scribe and chairing the group, ja, I think those are the other skills they are meant."

SAP5: "Interpersonal skills, communication skills, self esteem, ability to substantiate their own views, and social leadership."

FGP6: "And it is, it is also, it also prepares them for public speaking, because when they, when those rules rotate ne? Some particular time one will has to the speaker, and he has seen how the others conduct themselves when they respond back and it make those who are shy to try and tell the story at least *ubani* is doing it like this well let's try *nam* i change (*The interviewer laughing ironically*)." …. "Because *ubani* is good for, is speaking out loud and clarifying the point, so, why can't I? Because, how can this be? I can bit them, anything special about?"…. "They gain creativity in a sense that they can make their own meaning out of the information they get from you as a teacher or from a peer because most of the time you find out that you have this meaning of yours for this but once you interact with someone else it clears your mind that, okay I can also be able to do it like this. So, it opens their mind also it promotes *ii* social skills because by interacting with different people from different perspectives it gives them that insight of care, how to deal with different people, because people come in different forms. So if I'm coming across this kind of a thing how do I interact? Well, if I'm coming across this, this is the kind of a thing on how do I deal with."