HOW CAN COOPERATIVE LEARNING BE DEVELOPED TO ENHANCE THE TEACHING OF BIOLOGY AT SECONDARY SCHOOL LEVEL?

A thesis submitted in fulfilment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

of

RHODES UNIVERSITY

by

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November 2000

ABSTRACT

This research was undertaken by a group of practising teachers as a collaborative effort to develop a cooperative approach to the teaching of Biology at Secondary School level. The research focussed on Grade 10 learners at three different schools over a period of one full academic school-year. During this time, four complete cycles within an action research framework were completed and reflected upon. Learners were then surveyed by means of a questionnaire and follow-up interviews.

The reflective sessions, together with the responses from the questionnaire and interviews, provided a wealth of information with regard to the development of a cooperative approach to teaching. The cooperative classroom is vastly different from the traditional one. Here, new roles are assumed by both teacher and learner. Learners are largely expected to take charge of their learning experience in the classroom. The teacher, while still responsible for facilitating this learning experience, delegates authority to the learners.

It was the experience of the group that the relationship between teacher and learner, as well as between learner and learner, vastly improved in the cooperative class where the participants were more relaxed. Over time, learners became more accountable in terms of their work and learning. Learners' self-esteem and self-confidence grew, and the majority of learners indicated that their understanding of the work improved. Furthermore, the cooperative structure encouraged and developed self-discipline in the learners.

In the early stages of this research, the group did find certain behaviour to be inhibiting: excessive noise, laziness, too much tomfoolery, and absenteeism. These problems were easily addressed within the action research framework, and were nearly non-existent by the end of the research.

The group also found that: (i) cooperative lessons required more time than traditional lessons, often at the expense (justifiably) of the syllabus, and that: (ii) cooperative lessons played a major role in reactivating learner interest towards the learning process both in and outside the classroom.

ACKNOWLEDGEMENTS

This research project has been both exciting and enriching for me. Various persons and institutions have assisted me in conducting this research. I therefore extend my sincere appreciation to these persons and institutions.

- Professor George Euvrard, my supervisor, for his outstanding guidance and motivation throughout the research.
- Ursula van Harmelen and Professor Pat Irwin for their guidance and assistance during the early stages of the research.
- Patricia Abrahams and Helen Mandimo, my two co-researchers who unselfishly and diligently stayed with the project until completion.
- Shireez Sysaar who was part of the research team for half the cycles.
- All the other teachers who were involved for part of the research, or who were willing to be involved with this research.
- My colleagues who helped with editing and proofreading.
- The Department of Education for allowing me to conduct this research in the schools.
- The various schools, principals, and heads of department who were involved with this research.
- Librarians at both Rhodes University and the University of Port Elizabeth.
- My wife Lyn, and our daughters, Kaushanta and Natasha for being supportive, understanding and patient.
- Our Divine Mother of knowledge and education, for spiritual strength during this research.

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CHAPTER ONE
INTRODUCTION

> ***It would be an odd thing if collaborative group work were not seen as fundamental to the process of education since it is only through participating in communicative social action that human beings learn anything at all. And from the earliest years, these acts of communication are always two-way. This is particularly true of that form of communication called 'talk'. Endemic to all forms of talk between human beings is a principle of cooperation, however minimalist this may be***
> ***(John Quicke, 1999:68).***

1.1 BACKGROUND TO THIS STUDY

Education expands a person's capacity to choose, and generally opens further options for a fulfilling life. The provision of education in the Eastern Cape continues to present a challenge. The 1998/99 education budget could not make provision for the building of classrooms. At this stage there was a shortage of 21 250 classrooms (Lewis & Bot, 1998). For the period 1994 to 1999, secondary school enrolment in the country as a whole increased by 17%. In 1999, the Eastern Cape when compared to the other provinces, had the highest learner to educator ratio (Bot, 1999). The situation at my own school is that the learner to educator ratio is even higher than the average of the province, especially at the junior secondary level. The new scenario that we now face, for me, justifies an investigation into alternative teaching and learning methods as an attempt to address these new challenges.

Much has been documented about the state of education in South Africa in the apartheid era. Morris and Hyslop (1990:259), succinctly captured the essence of this period with the following description:

> The education system for African people was in a state of collapse. The material infrastructure was in shambles; inadequate supplies of books and other basic equipment and disintegrating buildings were common. Teachers were often poorly trained and demoralised. Students in many cases came to school without participating in classes. Violence among students was widespread. Police and other security forces frequently intervened in schools. Regular schooling and examinations were disrupted by endless rounds of student boycotts.

As far back as 1990, researchers such as Mehl (1990), stated that the improvement in education in South Africa would require more than just providing educational facilities. He suggested the moving away from authority-based teaching and learning styles that encourage rote-learning and proposed the development of a learner-centred approach where investigation and creativity are essential. Davidoff and van den Berg (1990) concurred by stating that transmission teaching, where learners are passive receivers of knowledge, would not develop either teachers or learners to their full potential, but would serve to consolidate the existing situation at schools.

Taylor (1999), similarly and more recently, stated that the new progressive movement is clear on the kind of learning goals appropriate to its vision for education. Schooling should equip learners to exhibit independence and initiative in directing their own learning. They should be able to ask questions, evaluate evidence, defend arguments, and apply their knowledge to new situations. Learners now should acquire higher order thinking skills that go beyond recall, recognition and reproduction of information.

During the apartheid years, the principal pedagogical alternative to the education system's Fundamental Pedagogics was 'progressive education', a form of learner-centred education nurtured in the liberal universities and the English private schools. In the 1980s the progressive learner-centred approach was linked to an egalitarian transformative project for South African education, with the result that People's Education was presented as the alternative to apartheid education (Report of review committee C2005, 2000). Jansen (1999), is of the view that the attempts to introduce 'alternative curricula' and People's Education were muted

and that the accounts of the effects of both have been remarkably exaggerated.

For South Africa, 1990 was significant because of political changes. Unprecedented political and economic pressures from liberation movements and the international community resulted in the unbanning of political organisations and the releasing of key political prisoners (Chisholm, 1994). The curriculum significance of the political moment in South Africa was that social movements and political actors began to stake their curriculum positions in anticipation of South Africa's first democratic state. The National Education Co-ordinating Committee (NECC), initiated the National Education Policy Investigation (NEPI) to develop education 'policy options' for the broad democratic movement (Jansen, 1999).

The main features of People's Education, NEPI (1992), Implementation Plan for Education and Training (IPET) (1994), and the African National Congress (ANC) (1994), have survived and are now central to Curriculum 2005. These features are: an egalitarian political mission; an anti-rote learning, critical thinking thrust; a learner-centred approach to teaching; teachers as curriculum developers; group work rather than directive teaching and community participation (Kraak,1998).

The C2005 Review Committee (2000), note that C2005 is probably the most significant curriculum reform in South African education of the last century. It is deliberately intended to overturn the legacy of apartheid education and to simultaneously, catapult South Africa into the 21st Century. It is seen as a bold and revolutionary statement of a democratic government wishing to break from the past. It is intended to bridge all where education and training, content and skills, as well as values and knowledge would find a place. The Review Committee further note that in the public domain, C2005 and Outcomes Based Education (OBE) are seen as interchangeable as there is seldom a discussion of one without the other. As early as 1997, the Department of Education defined C2005 as:

> An OBE curriculum derived from nationally agreed on critical cross-field outcomes that sketch our vision of a transformed society and the role

education has to play in creating it
(Report of C2005 Review Committee, 2000:8).

The focus in OBE is on clearly defined outcomes of the learning process, rather than on teacher input in terms of the content of the syllabus. There are two kinds of outcomes, the first of which is critical cross-field outcomes. These are more general in nature and are generated across different learning areas rather than in any specific area. They include among others: the identification and solution of problems; team work; the organisation and analysis of information; effective communication; social and environmental responsibility; and understanding of the interrelated nature of the world as a set of systems that do not exist in isolation. The second kind of outcomes is specific to each learning area, and it forms the basis for evaluation of progress and effectiveness of learning programmes. Specific outcomes will be evaluated through the use of a continuous assessment model that will be ongoing and formative or developmental in nature (Chisholm, 97:3).

For Gultig (1996), OBE is intended to be learner-centred. It puts learners first, recognising and building on their knowledge and experience, as well as responds to their needs. Learners should be motivated by providing them with positive learning experiences and affirming their worth. The implications for OBE methodology are that learning will have to be directed towards acquiring abilities and skills, rather than memorising information. The ability to solve problems, communicate effectively, work in groups, etc., cannot be developed except by practising these activities. For this to happen, Gultig suggests that there is a need for:

- an emphasis on activity based learning, with opportunities for learners to explore ideas and approaches to learning and to practise skills.
- cooperative as well as individual learning contexts so that learners can develop skills of working collaboratively in a group, and individually, and the ability to recognise when each mode is appropriate.

- the setting of tasks that integrate theory and practice, and manual and mental learning where practicable, and which link classroom learning to the broader society in which it is located.

1.2 OBE AND COOPERATIVE LEARNING

Slavin (1987:8) defined cooperative learning as: "a set of instructional methods in which students work in small, mixed ability learning groups". Brombacher (1994:1), a South African teacher and strong proponent of cooperative learning provides a more recent definition as:

> Cooperative learning involves learners working together and being responsible both for their own and each other's learning. Cooperative learning is a valid approach to teaching and learning that addresses and caters for the most fundamental cognitive and social needs of the learner.

Although I did not embark on this study in response to OBE or C2005, the timing of this new curriculum's implementation in our schools has allowed me the opportunity to see to what extent my study is relevant to it. Cooperative learning is highly compatible with OBE. Like OBE, cooperative learning which is based on social constructivist theory recognises the learner as a source of knowledge and that the learning process should expand on this prior learning. Secondly, cooperative learning develops in learners the various social skills that are often a prerequisite in the world of work. Thirdly, cooperative learning is activity based; it does provide learners with the opportunity to develop new ideas. Fourthly, cooperative learning does not foster rote-learning but rather provides learners with opportunities to acquire skills, solve problems and to be effective communicators.

Vinjevold and Taylor (1999), acknowledge that curriculum 2005 is a progressive curriculum aspiring to higher order learning goals such as the analysis and application of knowledge in addition to acquiring simple information. They are concerned by the assumptions that active learning such as working in groups, discussion among learners, the use of practical materials and examples from the

learner's experience are being promoted to achieve learning outcomes. Their concern stems from the fact that learning should involve cognitive and affective activity and not merely movement and speech. They therefore advise teachers to structure lessons carefully so that the cognitive faculties of the learners are also engaged.

It is my view that cooperative learning will play a significant role as a teaching method in C2005 and OBE. It is also my view that cooperative learning is a useful teaching method that all teachers should use in conjunction with other teaching methods, irrespective of the curriculum in use.

1.3 GOALS OF THIS RESEARCH

The primary goal of this research was to investigate how cooperative learning could be developed to enhance the teaching of Biology at secondary school level. This was done by:

1. Collaborating with other Biology teachers and using action research methodology to develop a cooperative teaching and learning method for Biology.
2. Evaluating learners' perceptions of the cooperative learning method through a questionnaire and follow-up interviews with them.
3. Identifying factors that favoured or inhibited the implementation of the cooperative learning method.

This study employed an action research framework. Although the term action research is widely used, no universally acceptable definition has emerged. Elliot (1991:69) defines action research as: The study of a social situation with a view to improving the quality of action within it. Fogarty (1997) states that nothing makes more sense than teachers embracing the role of reflective practitioners and engaging in practical action research in their classrooms. Elliot's definition and Fogarty's comment appeal to me as I was interested in improving my practice as a

teacher and I wanted to investigate this possibility for myself and within my own classroom environment.

While I was interested in improving my own practice, I was mindful of Schmuck's (1997) view that democratic participation and egalitarian cooperation are essential features of action research. For him, effective action research is democracy in action, especially as the action research fosters group reflection, joint inquiry, shared debriefings, and cooperative action planning. Whyte (1991) used the term participatory action research and Sagor (1992) used the term collaborative action research to indicate such joint undertakings. Winter's (1989) view that collaboration is more modest in its claims and more coherent in its approach to the question of impartiality also appealed to me. For Winter, the variety of differences between viewpoints culminates in a rich resource.

This research project had three distinct stages. In stage one, I approached various schools and teachers to form part of a collaborative research team. In this stage, I also shared seminal readings on key aspects of this research such as cooperative learning and action research with members of the research team. Once the team had a workable understanding of these key issues, we began to negotiate on various aspects for implementation and developed materials where needed. In stage two which lasted a full academic school year, we implemented our research using action research methodology with its four action moments of planning, acting, observing and reflecting. In stage three, the data was interpreted, the research was written up and recommendations were made.

1.4 CHAPTER OUTLINES

This research has been written up in eight chapters. The following is a brief description of what is revealed in each of these chapters:

- Chapter one introduces the research to the reader and describes what each of the other chapters contains.

- Chapter two reviews literature relating to cooperative learning. It is a critical account of the major contributions with regard to work in this area.

- Chapter three deals with the methodology of this research. Here I indicate the preference for a qualitative research and a rationale for selecting action research. Data collection techniques are described and is followed by a in-depth discussion of how the research team was formed and what preparations took place for this research to be implemented.

- Chapter four provides a detailed account of the four action cycles in this research project. Here, I describe and discuss our planning, acting, observing and reflection of each of the four cycles. This chapter provides information with regard to the research team's perspectives of the cooperative learning method.

- Chapter five deals with the learners' perceptions of the cooperative method as expressed by their responses to a questionnaire. This chapter provides a fairly detailed summary of the learner responses to the various questions posed to them. The most important categories of responses with a few actual learner comments are listed to provide the reader with an insight as to how learners perceived the cooperative learning method.

- Chapter six provides a summary of the transcripts of interviews held with a sample of learners from each of the three participating schools. Learners were interviewed as a follow-up to the questionnaire. The interview provided an opportunity to further clarify or probe learners for more detail when necessary. A summary of the interviews is provided as it presents the reader with the salient issues and opinions as expressed by the learners with regard to their cooperative learning experiences.

- Chapter seven identifies and discusses key areas that have emerged out of this research. Many of these key areas have developed through the different stages of the research and have been presented here as themes that run through this research. These themes present to the reader a view of what has evolved out of the research. The themes address the successes, difficulties and concerns in this research project.

- Chapter eight provides the reader with the findings of this research. This has been presented in the form of recommendations, limitations and recommendations for future research and implications of the study. The recommendations guide the reader as to what has worked in this research and cautions against possible stumbling blocks. The limitations try to raise questions about what might have been different if the circumstances were different or if other factors were present. Areas or issues that still need to be clarified are mentioned as possible future research areas. Chapter eight in general extracts and unites issues of this research to show what contribution this research has made to classroom teaching and learning.

CHAPTER TWO
LITERATURE REVIEW

> ***For as long as schools have existed, "teacher talk" has dominated the way in which students learn information and teachers communicate facts. Indeed, many teachers believe that once they utter the words in the classroom, the students have learned the information. Teacher talk for many teachers has been considered synonymous with student learning***
> ***(Lasley & Matczynski, 1997:240).***

2.1 INTRODUCTION

Covington (1992:130), asks the following question: "What is it about school that drives the hurtful, destructive dynamics that subvert the joy of learning and create such a profound conflict between ability and effort as sources of worth?" He states that many answers have been offered, but that none have come as close to the mark as that implied by John Krumboltz's mocking challenge:

> Imagine how we would go about designing an educational programme if our purpose were to make students hate to learn. [First, he suggests,] we would not involve them in establishing the purpose of their class. [Second,] we would require them to perform some impossible tasks - for example, to be perfect in everything they do. Third, when we discovered that the students were failing to master the impossible tasks, we would ridicule them and report their mistakes, failures and shortcomings to their friends and relatives. Fourth, just to pour some salt into the wounds, we would identify one individual in the class who was doing the tasks better than any of the others, and say, "If Frank can do it, why can't you?" This would isolate Frank and make all the other children hate him. Finally, if we should happen to catch any student helping another trying to master these impossible tasks, we would punish such cooperative behaviour unmercifully, insisting that each youngster work in silent solitude separated from the support and encouragement of fellow students (Krumboltz, 1990:10)

Covington states that it is hard to improve on this formula if the purpose is to make

learning unpleasant, yet ironically Krumboltz makes the point that these are precisely the circumstances that prevail in many schools today and help explain why children become alienated from school, hate teachers and learning, vandalize school property, and drop out as soon as they can.

There are three basic ways students can interact with each other as they learn. They can compete to see who is "best"; they can work individualistically toward a set goal without needing to pay attention to the efforts of other students; or they can work cooperatively, exhibiting concern about each other's learning as well as their own. The study of cooperative, competitive, and individualistic situations stems from a well formulated theory developed by Deutsch in the late 1940's.

Deutsch (1949) defined a cooperative interaction pattern as one in which the goals of separate individuals are linked together so that there is a positive correlation among their goal attainments. An individual in this goal structure can achieve his or her mutual goal only if the other participants achieve their mutual goals. Thus a person seeks an outcome that is beneficial to all those with whom he or she is cooperatively linked.

For Deutsch (1949:129), the crux of the differences between cooperation and competition lay in the nature of the way the goals of the participants in each of the situations are linked: “In a cooperative situation the goals are so linked that everybody sinks or swims together, while in the competitive situation if one swims, the other must sink”. For Covington (1992), there is little doubt that working together towards a larger, common purpose can motivate students individually to their best efforts. He states that a commonplace example is team sports, like volleyball, where the team’s success depends on the joint and individual contributions of all its members. If the team wins, all savour victory and if the team loses, then all suffer defeat collectively.

Cooperative learning is qualitatively different from what is often called "group work". In group work, students sit and sometimes work together. Students

contributions may be unequal, and some students may not contribute, participate, or learn at all. This kind of group work does not create interdependence and accountability. Cooperative learning, in contrast restructures the traditional classroom into small, carefully planned learning groups to provide opportunities for all students to work together and to learn from each other (Coelho, Winer, & Winn-Bell Olsen, 1989).

2.2 SOME GENERAL DEFINITIONS OF COOPERATIVE LEARNING:

> Cooperative learning is an instructional strategy in which students work together in groups that are carefully designed to promote positive interdependence (Abrami, Chambers, Poulsen, De Simone, D' Apollonia, Howden, 1995:1).

> Cooperative learning is a set of instructional methods in which students work in small, mixed ability learning groups (Slavin, 1987:8).

> Cooperative learning involves learners working together and being responsible both for their own and each other's learning. Cooperative learning is a valid approach to teaching and learning that addresses and caters for the most fundamental cognitive and social needs of the learner (Brombacher, 1994:1).

> Cooperative learning encompasses a wide range of strategies for promoting academic learning through peer cooperation and communication. As the term 'cooperative learning' implies, students help each other learn, share ideas and resources, and plan cooperatively what and how to study (Sharan & Sharan, 1987:21).

There is no single universal method of cooperative learning and no single guru who can speak for the entire field. The diversity of approaches includes the following: the principles approach of the Johnsons (1989), the structural approach of Kagan (1990), the group investigation approach of Sharan (1980, 1990), the complex instructional approach of Cohen (1994), and the collaborative approach described by Brubacher, Payne, and Rickett (1990). The following critical attributes are however common to all methods of cooperative learning:

- A task of learning activity suitable for group work
- Student-to-student interaction in small groups
- Interdependence structured to foster cooperation
- Individual responsibility and accountability
  (Davidson & Worsham, 1992).

2.3 BRIEF HISTORY OF COOPERATIVE LEARNING

Cooperative learning is an old idea. The capacity to work cooperatively has been a major contributor to the survival of our species. As early as the first century, Quintilian argued that students could benefit from teaching one another (Johnson, Johnson and Smith, 1991). The issue of cooperative versus competitive incentive structures is also one of the oldest themes in social psychology. Research on this topic was already well developed by the 1920's.

From 1920 to World War ll, the writings of John Dewey, Kurt Lewin, and Jacob Moreno gave the empirical basis of small group research. Dewey emphasized the social aspects of learning and the role of schooling for training students in problem solving and democratic, rational living. The research of Lewin and Moreno spearheaded practical, scientific work on group dynamics on different fronts. For Lewin and Moreno, group dynamics was a complex combination of science, therapy, social reconstruction, and morality (Schmuck & Schmuck, 1988).

In the 1940's, Morton Deutsch, building on the work of his teacher Lewin, proposed a theory of cooperative and competitive situations. This has since served as a foundation for subsequent research and discussion. A world-wide interest in the study of cooperative behaviour has emerged. David Johnson, a student of Deutsch is extensively involved in research on cooperative learning (Johnson & Johnson, 1987).

The International Association for the Study of Cooperation in Education was organized and met for the first time in Tel Aviv, in 1979. It met again in the United

States in 1982 and has since been meeting regularly to promote studies in cooperative education.

The research and development on classroom cooperation has over the last thirty years relied heavily on the work of David and Roger Johnson, Robert Slavin, Spencer Kagan, Shlomo Sharan, Rachel Hertz-Lazarowitz and others. In the following sections, reference will be made to research and literature spanning these years.

2.4 WHY COOPERATIVE LEARNING IS BEING ADVANCED

The teacher in many classes decides on what content to teach; how to teach the material; and even creates a conceptual structure for students to follow in learning the material. In essence, the intellectual burden appears to be on the shoulders of the teacher more than it is on students. Some teachers are quite satisfied with this circumstance and see no reason to instigate change. Others however, are advocating a new direction, one that places more intellectual burden on the student (Lasley & Matczynski, 1997). Roy Smith (1987:663), a junior high school English teacher embraces cooperative learning because “it places the responsibility for learning where it belongs: on the students”.

In many schools today, competition is rampant among a few, while others feel imprisoned and wait for the parting bell of the day (Graves, 1994). Fullan and Hargreaves (1991) contend that there is a ceiling effect to how much we can learn if we keep to ourselves. The ability to collaborate on both small- and large-scale is becoming one of the core requisites of post-modern society.

Kagan (1992) reminds us that the largest and fastest growing segment of the economy is the information segment. The norm in the workplace is interaction where interdependent teams work on complex problems which no individual alone can solve. Such new technological requirements are changing the educational equation in that the factory, top down organization model has been replaced in the

world outside of school by collective responsibility. This leaves today's learners ill served by the silent and frequently isolated teaching techniques. It is becoming evident that models of teacher talk, textbook memorization, tracking, and moving learners from box to box with a bell are poor examples for future workers and professionals. In the new workplace power is frequently shared, collaboration encouraged, and higher order levels thinking required. Cooperative learning as an organizational idea is thus being advanced to change the education process, engaging the minds of learners and connecting schooling to the world of work (Adams, Carlson, Ham, 1990; Cowie & Rudduck, 1988).

Contemporary life places a premium on citizens' abilities to relate well to others. This includes dealing with interpersonal tensions and conflicts between races, ethnic groups and sexes. Collaborative interaction is also vital to international relations, national politics, communities and family relationships. Schools have the increased responsibility for helping students learn behavioural skills that equip them to fill responsible and useful roles in society. This means that concurrent with the academic curriculum, schools must concern themselves with developing interpersonal skills in their students as well (Schmuck & Schmuck, 1988).

Sapon-Shevin and Schniedewind (1990), two early proponents and implementers of cooperative learning believe strongly in its potential to transform classrooms, schools, and ultimately society, by creating communities of caring and support. They further believe that if students and teachers can begin to redefine their roles in decision making about the classroom and the school, cooperative learning can become a potent model of empowerment. Ideally, this could lead to schools becoming models of democracy where all participants have a voice in what happens. Participants should then develop the ability to make and implement fair and reasonable choices.

2.5 SOME IMPORTANT WELL-RESEARCHED AREAS

Over the past 30 years there has been a considerable quantity of research

concerning the effects of cooperative, competitive, and individualistic incentive structures on individual and group productivity (Slavin, 1983). Cooperative learning methods have been among the most extensively evaluated alternatives to traditional instruction in use in schools (Brombacher, 1994 ; Slavin, 1987).

Reasoner (1986) states that parents today, when ranking educational goals, typically give high ratings to the promotion of self-esteem and the will to learn, right along with competency in reading, writing and mathematics. This according to Covington (1992) is a surprising fact as only a few decades ago proficiency in reading and mathematics dominated the polls. The goals of high academic achievement, high self-esteem, and good intergroup relations seem to have a universal appeal. The following review will focus on articles with cooperative learning as the independent variable and achievement, self-esteem, and intergroup relations as the dependent variables.

2.5.1 Cooperative Learning and Achievement

Investigation of the relative impact of the three goal structures, namely, competitive, individualistic and cooperative on achievement is the oldest research tradition within social psychology (Johnson & Johnson, 1990). Pragmatists are generally most interested in finding out which of these three goal structures are successful in promoting productivity and achievement.

In addition to the mastery and retention of material being studied, achievement is indicated by the quality of reasoning strategies used to complete the assignment, generating new ideas and solutions, and transferring what is learned within one situation to another (Johnson & Johnson, 1990). A number of researchers have focussed on the quality of reasoning strategy. Laughlin (1965, 1972) and his colleagues found that individuals working cooperatively used a focusing strategy in figuring out a concept underlying a set of numbers or words more frequently than did individuals working competitively or individualistically and, therefore, solved the problem faster.

By 1990, at least 323 studies with 1691 findings on productivity and achievement were conducted. About two-thirds of this research was conducted after 1970. A meta-analysis by the Johnsons (1990) regarding the 323 studies drew the following conclusions: When all the studies were included, it was found that the average cooperator performed at about two-thirds of a standard deviation above average competitors and three-quarters of a standard deviation above the average person working within an individualistic situation. This means that students at the 50th percentile in a cooperative learning situation will perform at the 75th percentile of students learning in a competitive situation and at the 77th percentile of students in an individualistic situation. Students in the competitive situation attained a slightly higher level of achievement than students in the individualistic learning situation.

Johnson and Johnson (1990) note that not all of the research included in this meta-analysis had been carefully conducted. However, when only the high quality studies were included in the analysis, students at the 50th percentile of the cooperative learning situation performed at the 81st percentile of the competitive and individualistic learning situations.

Augustine, Gruber, and Hanson (1990), three practising teachers in Minnesota were trained by the Johnsons at their Cooperative Learning Centre. These teachers state that each year they see improved achievement in a variety of curriculum areas in classes where cooperative learning takes place. Their experience has led them to believe that cooperative learning can benefit all students, even those who are low-achieving, gifted, or mainstreamed. These teachers feel that cooperative learning has dramatically changed their perception of teaching and learning. They state: " we now expect to see students in small heterogeneous groups discussing topics, using effective social skills, and what's most important, caring about each other's learning".

Slavin (1987, 1990), provides information with regard to sixty three studies on cooperative learning and achievement. Thirty six (57%) have found significantly

greater achievement in cooperative than control groups. Twenty six (41%) found no differences, and in one study the control group out-performed the experimental group. Slavin further notes that the effects of cooperative learning vary considerably according to the particular methods used. Where groups worked to achieve some goal or earned rewards or recognition, and where the success of the group depended on the individual learning of every group member, achievement effects were consistently positive. Thirty-four out of forty-one such studies showed positive achievement effects in contrast with four out of twenty-two studies that lacked group goals and individual accountability.

Sharan and Shachar (1988), used a specific cooperative learning method, namely, Group-Investigation, to test its effect on academic achievement on members of the Jewish ethnic group in Israel. They found that the academic achievement levels of students from the Group-Investigation classes were far superior to those from the Whole-Class method on sets of questions that assessed both low and high-level uses of knowledge.

Two South African researchers, Brombacher (1994), and Park (1995), are optimistic about the positive role that can be played by cooperative learning. Park believes that if teachers make the necessary paradigm shift from the traditional approach, which is teacher-centred, to one with a cooperative goal structure as outlined in his article, it is likely that cooperative groups would be widely accepted as an educational panacea to meet future educational challenges.

There is wide agreement among reviewers of cooperative learning literature that cooperative methods can and usually do have a positive effect on student achievement. The degree of consensus is even greater when group goals and individual accountability is part of the cooperative learning method. There is, however, controversy about the specific conditions under which positive effects will be found (Slavin 1990).

2.5.2 Cooperation and Ethnic / Racial Integration

Cooperation is a social method. It involves students working together as equals to accomplish something of importance to all of them. It is logical to expect that cooperative learning would have positive effects on social, motivational, and attitudinal outcomes (Slavin, 1990).

Allport (1954) cited evidence that when individuals of different racial or ethnic groups worked to achieve common goals, when they had opportunities to get to know one another as individuals, and when they worked with one another on an equal footing, they became friends and did not continue to hold prejudice against one another.

> Prejudice ... may be reduced by equal status contact between majority and minority groups in the pursuit of common goals. The effect is greatly enhanced if this contact is sanctioned by institutional supports ... and if it is of a sort that leads to the perception of common interest and common humanity between members of the two groups
> (Allport, 1954:281).

School desegregation rarely occurs in a context that meets the criterion under which the 'contact hypothesis' as stated by Allport and others, is expected to work (Brewer, Miller and Edwards, 1985). Researchers and practitioners have increasingly recognised the need to introduce programmes into desegregated schools in order to promote intergroup acceptance. Cooperative team-learning programmes feature prominently among those interventions developed over the past years. Students who work cooperatively in small learning groups tend to develop wider friendship circles and display increased interracial interaction within the treated classroom (Johnson, Johnson, and Maruyama, 1983). Cooperative learning methods explicitly use the strength of the desegregated school, the presence of students of different races or ethnicities, to enhance intergroup relations and other outcomes (Slavin, 1985).

In researching various cooperative instructional methods, Slavin (1985) found that studies relating cooperative learning to intergroup relations clearly indicate that

when students work in ethnically mixed cooperative learning groups, they gain in cross-ethnic friendships. The research also indicates that the effects of cooperative learning on intergroup relations are strong and long-lasting, and are more likely on close, reciprocated friendship choices than distant or unreciprocated choices. There were no clear patterns in this study that indicated more consistent results for some methods than for others.

A number of theoretical perspectives (contact theory, expectation-states theory, cooperation theory, frustration-aggression theory, and academic-learning-time theory) predict that when majority students work cooperatively with low-achieving minority students, the majority students will dislike their minority peers. A study by Johnson, Johnson, Tiffany, and Zaidman, (1983) tested such a prediction against a counterposition that states majority students who work cooperatively with low-achieving minority students will become committed to the minority students' success through supporting, regulating, and providing feedback for their task efforts and through joint involvement in achieving the group's goals. Furthermore, the personal commitment will result in increased liking for their minority peers. The results of the study confirmed their position. These results in turn cast doubt that equal status in terms of achievement level as stated in contact theory, is necessary for positive cross-ethnic attitudes to form. The results of their study demonstrated that cooperative learning stimulate, the kinds of friendship structures suggested by contact theory in actual classroom application. As predicted, the new friendships tended to be reciprocated and close. The study also showed that the new strong cross-race choices were made and received equally by blacks and whites. Granovetter (1973) earlier stated that strong friendships take more time, involve more intensity and intimacy, and are based on more reciprocal communication and exchanges of rewards than weak friendships.

Cooper, Johnson, Johnson, and Wilderson (1980) compared the effects of cooperative, competitive, and individualistic experiences on interpersonal attraction among heterogeneous peers. Their results indicate that when care is taken to structure competitive and individualistic experiences constructively,

cooperative and competitive learning experiences may promote greater interpersonal attraction among heterogeneous peers than do individualistic learning experiences. The results also indicate that cooperative experiences promote greater feelings of being accepted by peers than do competitive experiences and that more mutual helping among heterogeneous peers results from cooperative experiences.

The effects of cooperative learning on intergroup relations apply across all kinds of schools, subjects, student ages, and other dimensions. STAD, TGT, and TAI studies took place in American east coast urban and suburban schools in which the ethnic groups were Blacks and Whites. A jigsaw study involved Mexican-American, Black and Anglo students, whilst a Jigsaw II study took place in Toronto with Anglo-Canadians and European immigrants. A study by Sharan took place in Israel with Jews of European and Middle-Eastern backgrounds. With these studies, regardless of the ethnicities involved, the cooperative learning strategies apparently make it possible for students to see one another in a positive light and to form friendships based on human qualities rather than on skin colours or accents (Slavin, 1987).

A classroom structure can create a social climate or a pattern of social relations in which the members of a group are either accepted and valued by their peers or disparaged and alienated. Thus, classroom structures can be said to have either a positive or a negative ethnic-relations bias. Research evidence indicates that the adoption of cooperative class structures can radically change the entire social climate of a classroom so that minority children do not suffer the negative consequences of within-class segregation (Kagan, 1985).

2.5.3 Cooperative Learning and Self-Esteem

Walz and Bleuer (1992) believe that self-esteem cannot be given to another, as it must be earned and acquired by a person for him or herself. They do however feel that counsellors, teachers, and other helping persons can play an important

role in creating a climate for high self-esteem. Schmuck and Schmuck (1988) state that a key hypothesis in self-esteem theory is that people are attracted to those who give them favourable feedback and not attracted to those who demean them, regardless of whether or not the feedback is consistent with the recipients' views of themselves.

Slavin (1987), states that one of the most important aspects of a child's personality is his or her self-esteem. While many people may assume that self-esteem is a relatively stable personal attribute that schools have little ability to change, researchers working on cooperative learning techniques have come to a different conclusion. Students in cooperative learning classes have been found to have more positive feelings about themselves than do those in traditional classes. These improvements in self-esteem were found for several different cooperative methods, namely, Teams-Games-Tournament (TGT), Student Teams-Achievement Division (STAD), Jigsaw and Team Assisted Individualization (TAI).

Lazarowitz, Hertz-Lazarowitz, and Jenkins (1985), experimented with a Modified Jigsaw. In 2 of 3 experiments, results significantly favoured an increase in self-esteem. The 3rd experiment showed a decrease in self-esteem for both the experimental and control group. Where the Modified Jigsaw was successful, students made such comments as, "I made more friends, " "I felt important when helping others," "I learned more," and "It makes me feel needed". Lazarowitz et al, hasten to remind that although their research produced significant positive feelings, one should be cautious as various other research has shown that permanent changes in self-esteem are usually slow in developing.

Self-worth theory (Covington, 1984d, 1985c, 1987; Covington and Beery, 1976) assumes that the search for self-acceptance is the highest human priority, and that in schools self-acceptance comes to depend on one's ability to achieve competitively. In our society there is a pervasive tendency to equate accomplishment with human value, or put simply, individuals are thought to be only as worthy as their achievements. Because of this, it is understandable that

students often confuse ability with worth. For those students who are already insecure, tying a sense of worth to ability is a risky step because schools can threaten their belief in their ability. This is true because schools typically provide insufficient rewards for all students to strive for success (Covington, 1992).

Findings by Hare (1985), show that the feelings of well-being among many minorities have little to do with performing well at school. It is felt that these minority students find strength in peer acceptance, nurturance, and cooperation. Slavin (1987) concurs stating that the liking of others and feeling liked by them are obvious components of feeling worthwhile. For Walz and Bleuer (1992), an important principle of human relationships is that we tend to feel most comfortable with persons whose self-esteem level resembles our own. High self-esteem individuals tend to be drawn to high self-esteem individuals.

2.5.4 Preparing Learners for Cooperation

Cohen (1994) and Schniedewind and Davidson (1987) warn that it is unrealistic to assume that learners know how to work together effectively in groups. Learners must therefore be prepared for cooperation so that they know how to behave in the groupwork situation without direct supervision. Cohen indicates that teachers, particularly at secondary school level, feel so much pressure to cover curriculum that they do not want to take time to prepare students for cooperation. This, she states, would be unwise as in the long run more time would be lost through disorganized group behaviour than would be spent on advanced training.

Johnson and Johnson (1997) similarly indicate that we are not born with group skills and that all skills are learned in the same way. While each teacher should identify the specific skills needed for each cooperative session they engage in, Johnson and Johnson identified *communication, leadership, creating and maintaining trust and utilising creative controversy* as being the most important skills needed to facilitate the cooperative learning process. They also suggest the following steps as needed to learn these skills:

- Understand why the skill is important and how it will be of value.
- Understand what he skill is, what are the component behaviours needed to perform the skill, and when it should be used.
- Find situations in which to practice the skill.
- Assess how well the group skills are being implemented.
- Keep practising until the skill becomes an automatic habit pattern.
- Load your practice towards success.
- Get friends to encourage the use of he skill.
- Help others learn the group skill.

2.6 LEARNING THEORY UNDERPINNING COOPERATIVE LEARNING

While much has been said about the positive effects of cooperative learning, it is also important to take note of the learning theories put forward by researchers for the successes of this teaching method.

Bennett and Dunne (1995) contend that what children learn in the classroom will depend to a large extent on what they already know. Children, irrespective of their age, have some knowledge and conception of the classroom topic they are faced with. These conceptions or schemata are acquired from books, television, talking to parents and friends, visits to places of interest, previous work in school, and so on. Children therefore, do not come to any lesson empty-headed, they come with partial schemata.

It is important to note that irrespective of what form knowledge is presented to the child, that is by the teacher or group mates, it is the child who makes sense of these inputs by constructing links with their prior knowledge. It is assumed that the construction of links is an active intellectual process involving the generation, checking and restructuring of ideas in the light of those already held. Construction

of meaning is a continuous process and this view of learning is often referred to as 'Constructivist'.

While Piaget proposed that children actively constructed their own knowledge, more recent researchers such as Bruner (1986), and Vygotsky (1978) before him believe that learning is a communal activity. Bruner stresses the importance of the social setting in learning. Vygotsky too, believes that a variety of internal developmental processes are able to operate only when the child is interacting with people in his environment and in cooperation with his peers. For these researchers, social interaction is central to learning. It is this theory, social constructivism, that underpins cooperative learning. Presseisen (1992) states that proponents of cooperative learning have extended this social thesis into educational practice.

2.7 SOME WIDELY USED COOPERATIVE LEARNING METHODS

Research on specific applications of cooperative learning to the classroom began in the early 1970's. At present researchers all over the world are studying practical applications of cooperative learning principles. Many cooperative learning methods are available. The following are some of the most extensively researched cooperative methods used in elementary and secondary classrooms:

2.7.1 Student Team Learning

Student Team Learning methods are cooperative learning techniques developed and researched at Johns Hopkins University in the United States of America. In addition to the idea of cooperative work, Student Team Learning methods emphasize the use of team goals and team success which can be achieved only if all members of the team learn the objectives being taught. The students' tasks are not to do something as a team but rather to learn something as a team.

Three concepts are central to all Student Team Learning methods. These are:

team rewards, individual accountability, and equal opportunities for success. Teams may earn certificates or other team rewards if they achieve above a designated criterion. Four principal Student Team Learning methods have been extensively developed and researched. Two are general cooperative learning methods adaptable to most subjects and grade levels. These are: Student Teams-Achievement Division (STAD) and Teams-Games-Tournament (TGT). The other two are comprehensive curricula designed for particular subjects in Grades 3 to 6. These are: Team Assisted Individualization (TAI) for mathematics and Cooperative Integrated Reading and Composition (CIRC) for reading and writing.

2.7.1.1 Student Teams-Achievement Division (STAD)

Students are assigned to four-member learning teams that are mixed in performance level, sex, and ethnicity. The teacher presents a lesson and then students work within their teams to make sure that all team members have mastered the lesson. Finally, all students take individual tests on the material, at which time they may not help one another. Students' test scores are compared with their own past averages, and points are awarded based on the degree to which students meet or exceed their earlier performance. These points are then summed-up to form team scores. The whole cycle of activities from teacher presentation to team practice to test usually takes three to five class periods (Slavin, 1978, 1986).

2.7.1.2 Teams-Games-Tournament (TGT)

In this model the teacher uses presentations and teamwork similar to STAD, but replaces the tests with weekly tournaments in which students compete with members of other teams in order to contribute points to their team scores. Students compete at three-person "tournament tables" against others with similar

past records. A "bumping" procedure, which consists of changing students' table

assignments weekly based on their performance in each tournament, keeps the competition fair. High performing teams earn certificates or other forms of team rewards. Teammates help one another prepare for the games by studying worksheets and explaining problems to one another. To ensure individual accountability teammates cannot help during competition (De Vries and Slavin, 1978; Slavin, 1986).

2.7.1.3 Team Assisted Individualization (TAI)

This method also uses four-member mixed-ability learning teams and certificates for high-performance teams. While STAD and TGT uses a single pace of instruction, TAI combines learning with individualized instruction. It is specifically designed to teach mathematics in Grades 3 to 6 or older students not ready for a full algebra course.

Students enter an individualized sequence according to a placement test and then proceed at their own rates. Team members work on different units. Teammates check each other's work against answer sheets and help one another with any problems. Final unit tests are taken without teammate help and are scored by student monitors. Each week, teachers total the number of units completed by all team members and give certificates or other rewards to teams that exceed a criterion score based on the number of final tests passed, with extra points for perfect papers and completed homework. Because students take responsibility for checking each other's work and manage the flow of materials, the teacher can spend most of the class time presenting lessons to small groups of students drawn from various teams who are working at the same point in the mathematics sequence (Leavey, Madden, and Slavin, 1986).

2.7.1.4 Cooperative Integrated Reading and Composition (CIRC)

This Team Learning method is a comprehensive programme for teaching reading and writing in the upper elementary grades. In CIRC, teachers use basal readers

and reading groups, much as it is used in traditional reading programmes. Students are assigned teams composed of pairs of students from different reading groups. While the teacher is working with the one reading group, students in the other groups are working in their pairs on a series of cognitively engaging activities, including reading to each other, predicting how stories will end, summarizing stories to each other, writing responses to stories, and practising spelling, decoding, and vocabulary.

In most CIRC activities, students follow a sequence of teacher instruction, team practice, team preassessments, and test. Students do not take the test until their teammates have determined that they are ready. Team rewards are certificates given to teams based on the average performance of all team members on all reading and writing activities. Because students work on materials appropriate to their reading levels, they have equal opportunities for success. Students' contributions to their teams are based on their test scores and their final independently written composition, which ensures individual accountability (Stevens, Farnish, Madden and Slavin, 1987).

2.7.2 Jigsaw

This method was designed by Aronson and Colleagues (1978). Students are assigned to six-member teams to work on academic material that has been broken down into sections. Each team member reads his or her section. Next, members of different teams who have studied the same section meet in "expert groups" to discuss their sections. The students return to their teams and take turns teaching their teammates about their sections.

A modification of Jigsaw, called Jigsaw II, has been developed at Johns Hopkins University. Here, students work in four- or five-member teams, as in TGT and STAD. Instead of each student being assigned a separate section, all students read a common narrative, such as a book chapter, a short story, or biography. Each student receives a topic on which to become an expert. Students with the

same topic meet in expert groups to discuss them, then return to their teams to teach what they have learned to their teammates. Students take individual tests, which results in team scores. Teams meeting preset standards earn certificates.

2.7.3 Group Investigation

This method was developed by Sharan at the University of Tel-Aviv. It is a general classroom-organization plan in which students work in small groups using cooperative inquiry, group discussion, and cooperative planning and projects (Sharan and Sharan, 1976). In this method, students form their own two-to-six-member groups. The groups choose topics from a unit being studied by the entire class. They break these topics into individual tasks and carry out the activities necessary to prepare group reports. Each group presents or displays its findings to the entire class.

2.7.4 Learning Together

Developed by David and Roger Johnson at the University of Minnesota, this method uses a group-study task structure, with a cooperative incentive structure in which students receive a group reward for a group project. Learning together involves the highest degree of cooperation between students, and can be used for most subjects. Experiments using this method have been done with students in Grades 2 to 6. It begins with whole-class instruction by the teacher. Assignment sheets are completed cooperatively by the group and handed in as a group project. Students are rewarded based on the performance of the entire group.

2.8 PROBLEMS WITH COOPERATIVE LEARNING

No teaching method or technique is problem-free. Cooperative learning is thus also not without problems. Some teachers who have experimented with cooperative techniques complain that some students dominate and other students fail to participate (Lasley & Matczynski, 1997). Whilst vigorous disagreement

about how to solve a problem, or about the social issues under discussion, is a positive feature of cooperative learning, some students do not know how to handle a disagreement and resort to personal attack or 'put downs', feeling that their ideas have been rejected. Another problem is physical and social rejection of some members of the group. Some may quite directly object to a particular student being in the group, or they may indicate their rejection with body language (Cohen, 1994).

In certain cooperative techniques the absenteeism of a group member leads to other members feeling let down by that particular student. This could lead to rejection or animosity towards the particular student. The fear by high performing students that they may be forced to work at a slower pace is also a reason for concern about cooperative methods, especially by these high performing students.

Groupwork changes a teacher's role dramatically. Authority is now delegated to students and to groups of students who are in charge of insuring that the job gets done. No longer is it the responsibility of the teacher to watch for every mistake and correct it on the spot (Cohen, 1994). Many teachers experience real discomfort when they do not have complete control over how students process content. Such teachers believe that they have somehow lost control of the teaching-learning process (Lasley & Matczynski, 1997).

2.9 SUMMARY

Cooperative learning methods are not new. Teachers have used them for many years in the form of laboratory groups, project groups, discussion groups, and so on. However, recent research in the United States and other countries has created systematic and practical cooperative learning methods intended for use as the main element of classroom organization.

Over the past thirty years there has been a considerable quantity of research concerning the effects of cooperative, competitive, and individualistic incentive

structures on individual and group productivity.

Schools it would seem are being forced to address the needs of the workplace and society as a whole. New technological requirements seek a workforce that can share power and collaborate. Schools are being accused of not preparing workers adequately for this new role. Society is demanding that schools play a role in helping students learn behavioural skills that will equip them to be useful members of society.

With regard to achievement, it does not seem realistic to simply make a general decision about its success. One reason is that cooperative learning has developed so broadly, utilizing several methods. Not all of these methods have had equal success, and therefore, depending upon which methods have been reviewed, the success rate for enhancing achievement could be biased. It would therefore be more useful to accept Slavin's (1983) suggestion of not generalizing across widely divergent tasks, settings, outcome measures, etc., but to focus on small well-defined areas.

Johnson and Johnson reviewed over a thousand studies in 1985 and concluded that cooperative learning experiences promote more learning, and that the findings are consistent over a range of age groups, subject areas, and learning activities. Slavin (1983) emphasizes that group rewards and individual accountability are necessary in promoting achievement and productivity.

Cooperative learning also seems to be having success with improving cross-ethnic relations. One of the major goals of desegregation, is to close the achievement gap between majority and minority students. Mere mixing without specific intervention has had little success (Brewer, Edwards, Miller, 1985). Results from various studies show that cooperative learning has improved cross-ethnic friendships. Johnson *et al*. (1983) disproved the theory that majority students would dislike their minority low-achieving peers in a cooperative setting. Their results showed the contrary. Cooper *et al*. (1980) found that cooperative

experiences promote greater feelings of being accepted by peers than competitive experiences.

Almost all studies that compare the self-esteem of students following cooperative and traditional interaction, show significant gains favouring students in cooperative classrooms. The remaining studies show no differences. None of the studies had results that favoured traditional structures. This outcome is probably related to improved peer relations and to improved academic achievement.

Cooperation and competition do not represent an either-or dichotomy. Instead, the teacher must decide on the purpose of a lesson and the concomitant needs of the students involved in that lesson. Effective teachers understand that students need to learn to work together just as much as they need to function independently. Living in a democratic society demands both types of skills. The teacher has to therefore carefully and intentionally arrange the classroom environment so that students have appropriate opportunities to learn requisite social and academic skills (Lasley & Matczynski, 1997).

CHAPTER 3

RESEARCH PROCESS AND METHODOLOGY

One of the prominent concerns of educational reformers is that classroom instruction is too traditional - teacher controlled and teacher centred. Lessons are organized around specific correct and incorrect responses, and students, especially from culturally diverse backgrounds, have too few opportunities to use their cognitive style dispositions and to explore their own thinking skills. As a consequence, many students, especially those who lack the necessary "academic skills", begin to psychologically exit the system (Lasley & Matczynski, 1997:101).

3.1 INTRODUCTION

In general, I saw myself as part of the broad consensus that Taylor and Vinjevold (1999) speak about when they state that teaching and learning in the majority of South African schools leave much to be desired. The problems according to them are generally described in terms of teacher-centredness, learner passivity, rote learning, and the like.

In chapter one, I provided the background and motivation for undertaking this study. The next challenge was the thought and planning needed to realise this goal. Decisions on whether it would be a qualitative or quantitative study had to be faced. My decision in wanting to undertake this study as a teacher in collaboration with other similar minded teachers for the improvement of our own practice led me to be convinced that a qualitative study using action research methodology was the most appropriate road to follow.

The following paragraphs in this chapter allow the reader to accompany me on this road to share in the process, development, and growth that we experienced.

3.2 THE PREFERENCE FOR QUALITATIVE RESEARCH AND

RATIONALE FOR SELECTING AN ACTION RESEARCH APPROACH

I selected a qualitative approach for this study as it seemed more appropriate to deal with phenomena not easily translatable into numbers. This included information from techniques that I used in this research such as interviews, observation, non-verbal cues and unobtrusive measures, as well as documentary and record analysis (Guba and Lincoln, 1989). Wamahiu and Karugu (1995) contend that researchers who adhere to the quantitative approach lay emphasis on directly observable "facts", not on meaning or purposes. These quantitative researchers further believe that humans are passive objects, reacting to external stimuli in much the same way that objects in the natural world do.

Qualitative research is useful to the educational researcher in a variety of contexts. It helps the educational researcher to obtain in-depth data both within and outside the school. The qualitative researcher's emphasis on obtaining the insider's as opposed to the outsider's view of the situation and events may help to tackle problems facing the school at its roots. Elliot (1989:1) speaks of the estrangement felt by practitioners in the face of traditional educational research and its products:

> Firstly, teachers feel "theory" is threatening because it is produced by a group of "outsiders" who claim to be experts at generating valid knowledge about educational practices ...[in ways that] possess little resemblance to the way teachers process information as a basis for their practical judgements ... [and negate] their professional culture which defines teaching competence as a matter of intuitive craft culture.
>
> Secondly, the feelings of threat may be enhanced if the knowledge generated is couched in the form of generalisations about teachers' practices ... generalisation constitutes the denial of the individual practitioner's every day experience. It reinforces the powerlessness of teachers to define what is to count as knowledge about their practices.

Brause and Mayher (1991), point out that, historically, educators were expected to

read and use the research which educational researchers conducted through large-scale testing programmes in isolated laboratory settings. It was predictable that classroom teachers found little in the decontextualised, laboratory-based research to inform their practice with specific students. It also therefore carried little, if any weight in professional decision-making.

Van den Berg (1994) cites one of Corey's (1953) earliest books where he supports educational Action Research. Here Corey speaks of the way natural scientific research paradigms dominate the study of education. The laboratory-controlled situation was seen as the ideal and traditional research held

> ... that the chief justification for scientific investigation in education is the establishment of generalizations that can be stated as observed uniformities, explanatory theories, or scientific laws. Hypotheses are to be tested in such a way as to warrant conclusions extending beyond the populations or situations studied. The interest is in discovering "the truth" or coming as close to it as possible. Practising school people are to use this "truth" to improve the quality of research
> (Corey, 1953).

This kind of research Corey points out is not "an activity for amateurs to engage in", and is seen as producing "truth" which teachers are then to "apply" in their practice. Corey (1953:1) further states that this "applied science" approach to the study of education ... "has held little effect on the way school practitioners - teachers, supervisors, and administrators - go about trying to solve their personal problems".

Corey (1953:viii) suggests that teachers be drawn into the research effort. He terms this process "action research" and defined it as "research that is undertaken by educational practitioners because that by doing so they can make better decisions and engage in better action".

Ely (1991:2) also states that most of us grew up in a positivist or empirical era in which the claims of empirical scientific research were held to be absolute. This empirical world view has now been challenged by an alternative paradigm

frequently referred to as naturalistic. Those who work within the naturalistic paradigm operate from a set of axioms that hold realities to be multiple and shifting. It takes for granted a simultaneous mutual shaping of knower and known, and see all inquiry, including empirical, as being inevitably value-bound.

Ely (1991:4), basing her work on Sherman and Webb (1988), provides the following characteristics that are similar for most species of qualitative research:

- Events can be understood adequately only if they are seen in context. Therefore, a qualitative researcher immerses her/ himself in the setting.
- The contexts of inquiry are not contrived; they are natural. Nothing is predefined or taken for granted.
- Qualitative researchers want those who are studied to speak for themselves, to provide their perspectives in words and other actions. Therefore, qualitative research is an interactive process in which the persons studied teach the researcher about their lives.
- Qualitative researchers attend to the experience as a whole, not as separate variables. The aim of qualitative research is to understand experience as unified.
- Qualitative methods are appropriate to the above statements. There is no one general method.
- For many qualitative researchers, the process entails appraisal about what was studied.

The desire to have my research conclusions more readily accepted by practising teachers such as myself, has therefore prompted me to use a qualitative research methodology. The need to be a participant in the research with the aim of improving my own teaching has led me to select an action research approach.

An action research framework possesses features that makes it an attractive research method for me as an ordinary teacher wanting to undertake an investigation within my own class, to improve my own teaching practice. McNiff (1988), states that educational action research may be seen as an umbrella term for what goes on in class when a teacher decides to change a taken-for-granted situation and opts to become the researcher of his own class practice. McNiff further states that when applied to classrooms, action research is an approach to

improving education through change, by encouraging teachers to be aware of their own practice, to be critical of that practice, and to be prepared to change it.

Cohen and Manion (1994) identify who actually undertakes action research at schools: The single teacher operating on his own with his class who feels the need for some kind of change or improvement in teaching; a group of teachers working cooperatively within one school; a teacher or teachers working alongside a researcher in a sustained relationship.

Corey (1953:70), found that many teachers supported his assumptions when he stated:

> We are convinced that the disposition to study, as objectively as possible, the consequences of our own teaching is more likely to change and improve our practices than is reading about what someone else has discovered regarding the consequences of his teaching. The latter may be helpful. The former is almost certain to be.

3.3 DEFINITIONS OF ACTION RESEARCH

Lewin (1946) coined the term 'action research' and described it as a spiral of steps, with each step having four stages: planning, acting, observing and reflecting. Many researchers, including Kemmis (1982) have based their ideas on Lewin's original concept, but have refined it to have the capacity to deal with a number of parallel problems (McNiff, 1988). Other prime features of action research are: that it deals with situational problems; that the findings are applied immediately or in the short term; that it is collaborative, recognising distinctive points of view; that it is flexible and adaptable (Cohen and Manion, 1994).

The term action research is widely used. Although no single, universally acceptable definition has emerged, the following are some of the definitions commonly used to describe it: Elliot (1991:69) sees action research as: “The study

of a social situation with a view to improve the quality of action within it".

Carr and Kemmis (1986), provide one of the most widely accepted working definitions:

> Action research is a form of self-reflective enquiry undertaken by participants (teachers, students or principals, for example) in social (including educational) situations in order to improve the rationality and justice of (a) their own social or educational practices, (b) their understanding of these practices, and (c) the situations (and institutions) in which these practices are carried out.

Cohen and Manion (1994:217) are of the opinion that the usage of the term action research varies with time, place and setting. They however offer the following definition: "action research is small-scale intervention in the functioning of the real world and a close examination of the effects of such intervention".

McNiff (1988:1) describes action research as:

> the name given to an increasingly popular movement in educational research. It encourages a teacher to be more reflective of his own practice in order to enhance the quality of education for himself and his learners. It is a form of self-reflective enquiry that is now being used in school-based curriculum development. It actively involves teachers as participants in their own educational process.

A National Conference on Action Research, held at Deakin University in 1981, formulated attributes of action research in the form of a definition. Grundy and Kemmis (1981:3) present an adapted version of this definition as follow:

> Educational action research is a term used to describe a family of activities in curriculum development, professional development, school improvement programmes, and systems planning and policy development. These activities have in common the identification of strategies of planned action which are implemented and then systematically submitted to observation, reflection and change. Participants in the action being considered are integrally involved in all of these activities.

Although none of the definitions listed above seem to be in conflict with each

other, one should expect interpretations to vary and increase (McNiff, 1988). The main focus of action research in classrooms and schools is to encourage teachers to become involved in their own practice, and to view themselves as researchers (Stenhouse, 1975).

3.4 STAGE 1: PREPARATION

3.4.1 The Formation and Preparation of a Collaborative Research Team

3.4.1.1 Introduction

The research approach consisted of three distinct stages:

- Stage 1: the formation and preparation of a collaborative research team;
- Stage 2: the investigation of our research hypothesis;
- Stage 3: the description and interpretation of the data.

Many teachers seem to want to change their teaching, yet are often put off from doing so because it seems to be such an enormous task, and because they have no clear idea of where or how to begin. At the same time, teachers have a sense of being isolated and alone, and as a result they feel helpless and frustrated (Davidoff & van den Berg, 1990).

On 9 August 1995, I presented a seminar of my research proposal to members of the Faculty of Education at Rhodes University. This daunting task I am told is part of the procedure followed in preparation for submitting a research proposal for approval to the Rhodes' Humanities Higher Degrees Committee. At the end of my presentation, I was given the go-ahead to start working on my research team. This was important as I wanted to start my research at the beginning of the 1996 academic school year for various obvious logistical reasons . I therefore had from

this time until the close of school in 1995 to form and prepare a collaborative research team to be ready to start our research in our schools at the beginning of the 1996 school year.

3.4.1.2 Forming the Team

I had decided on doing this research in collaboration with other teachers. I thought that this would be a good exercise as I could then have other members to interact with in terms of collecting data and reflecting on progress made. This idea evolved as I became more familiar with action research methodology. Action research generally lends itself to teamwork. It is usually (though not inevitably) collaborative when teams of researchers and practitioners work together on a project. It is participatory as team members themselves take part directly or indirectly in implementing the research (Cohen and Manion, 1994; Oja and Smulyan, 1989). Elliot (1982) maintains that action research is distinguished by its adherence to a collaborative ethic where groups of practitioners work together to understand better their own practice.

Approaching the Department of Education

When undertaking a research project of this magnitude within the school environment, the formation of a research team has to start first with the obtaining of consent to undertake the research and approval to have access to schools. I had carefully followed the correct channels of communication within the Department of Education. I seized the opportunity to discuss my intended research with my circuit inspector on one of his visits to our school. I presented him with a copy of my research proposal. He assured me that he would read the proposal and did not foresee any problem with running the project. I informed him that I would be contacting our Regional Director's office to set up an appointment to discuss my intended research with him as well. This I thought to be important as approval by our Regional Director would help when I needed to approach the different schools to be a part of the project.

The Director's secretary would not give me an appointment and indicated that he was booked-up for quite some time. The alternative suggested by her was to make a written request with regard to my intended research. I was not too happy with this arrangement, as I wanted to personally motivate the need to conduct this research within our schools. On 16 August, I dropped off my request with the Director's secretary and asked for a prompt reply (see appendix 1). I received a prompt reply dated 23 August from the Director in which he stated that the Department of Education supported the research and further was willing to assist. He did however caution that the research should not interfere with teaching and learning and that principals of individual schools would have to be approached for their willingness to be a part of the research. I was delighted with this speedy and very positive response (see appendix 2).

Approaching Schools

I had decided that I would approach schools that were close in proximity to my own to participate in the research project. My main reason for this decision was that it would enable me to liase personally with co-researchers with ease. I would not have the time to travel great distances as I would have all my normal teaching responsibilities as well as being co-researcher and facilitator. I anticipated times when we would need quick informal meetings or times when I needed to drop and/or collect materials, or even monitor progress of fellow researchers within the teaching day. I identified the following schools as possibilities for inclusion: St. James and David Livingstone both of which are in my own teaching suburb, Alexander Road High, an ex-model C school and Springdale Secondary School in Gelvandale. I wanted to include at least one school from the African townships even though the distance would be much greater than for the other schools. I identified Newell High and Ithembelihle High in New Brighton as being the closest to me.

I decided that my strategy would be to first approach the principals of the selected

schools. I would arm myself with the consent letter from the Department of Education and a copy of my research proposal. I would follow this up with a meeting with the school's Biology Head of Department. Finally, I would meet with prospective teacher/s at the various schools. Although I feel that the prospective teacher to be the most important for participation in the research, I did not want to have problems arising out of bypassing the hierarchy at the schools. I also prepared myself for the possibility that a principal or Head of Department might be willing for participation but that the respective teacher/s at their school might not wish to be involved with the research project. I decided that I would abide by the individual teachers' decision for or against participation irrespective of a positive view by the principal or Head of Department. I would not try to force or coerce participation.

I would start with my own school. This I thought would give me some practice as I wanted my story to be quite clear when I approached the other schools. I intended contacting the schools immediately, possibly one per day, with the hope that prospective participating teachers would be able to meet with me before the close of schools for the vacation at the end of September. In order to identify possible teachers for participation, I realized that I would need to identify the grade-grouping for the research project. I decided on Grade 10. I felt that the learners in this group would be mature enough to work independently as compared to Grade 8 or Grade 9 learners. My own experience is that most schools are not eager to allow for a deviation or experimentation with the more senior learners in Grades 11 and 12. I acknowledge that I was not allowing for negotiation of the selection of the grade-grouping with the envisaged research team as would be in keeping with action research procedures.

Paterson High School

This is where I teach. I discussed my research plans with my principal. He seemed quite impressed with what I wanted to do and gave his support for my research. On 30 August, I met with my Head of Department. I informed him

about my research and requested Grade 10 classes for 1996. I also obtained his consent to speak to two other teachers who had been teaching Grade 10 in 1995 about their participation as co-researchers. One teacher indicated that she was not available as she intended taking leave in 1996. The other teacher (Shireez) was willing to participate. I then negotiated with my H.O.D for Shireez and myself to teach all the Grade 10 classes for 1996. I had given Shireez a copy of my research proposal and briefly discussed what the research would entail.

St. James Secondary

On 5 September I met with the principal of St. James. She was very positive about the research. St. James is a Catholic school and cooperation/collaboration feature prominently in the school's educational vision. She advised me to meet with her Biology subject head and stated that I could inform him that she was willing for the school to participate in the research. I met with the subject head the next day. He is someone that I know on a personal level. He was quite excited about the project and immediately took me to see the Grade ten Biology teacher (Patricia). I shared some ideas about the research with Patricia. I gave her a copy of the proposal and suggested that she read it and that I would see her again a few days later. After three days, I visited her at school again and she agreed to participate in the project. She was quite enthusiastic about cooperative learning and immediately felt that the teaching method would work. I was greatly encouraged by her enthusiasm and positive attitude.

Alexander Road High

On 7 September I met with the principal of this school. We had a brief discussion about my intended research. He informed me that their school was quite keen on cooperative learning and that we should meet with the Biology Head of Department. He called the H.O.D in. I informed about the research project. She informed me that their school was already using cooperative learning and that they were not prepared to start afresh. A further problem was that at least four

teachers would be sharing Grade 10 in 1996. I inquired about their availability if I needed to consult with them. The principal and H.O.D were agreeable to this.

David Livingstone Secondary

On 1 September I met with Mr. Peters the principal of the school. It was quite easy talking to him as we know each other. He was quite excited to hear about my research as he himself was busy with his own studies. He was willing for their school to be part of this project. He sent me to meet the Biology H.O.D. She was also someone that I knew. I briefly outlined the proposed research to her. She was quite eager and stated that she would speak to the other teacher and get back to me. I was quite encouraged by her saying that we should help each other. A week later she sent me a letter stating that she regretted not being able to take part in the research project. She added that they had a workshop on cooperative learning about two years ago and that her Grade 10 teacher had tried out the method and that it did not work. She, the H.O.D herself was not available as she was contemplating taking long leave. I was quite disappointed, as this school is in the same suburb as my own and we both experience similar socio-economic conditions, etc.

Ithembelihle Senior Secondary

I met with the principal on 13 September. I remember my surprise at him being a white person in a school in a black suburb. He spoke very easily and identified with the need for this type of research. He had been teaching at the school for some time and also experienced difficulty with the large classes. He promised to give my proposal to the Biology H.O.D. A few days later I returned to meet with the H.O.D. He felt that the topic of the research was really worth investigating, but informed me that he did not think that he would be returning to the school in 1996. I found myself in a difficult situation as he had not as yet informed his principal about his intentions. This made enquiring about an alternate teacher difficult. I left with him promising to call me if the situation changed. I somehow sensed that

this would not happen.

Newell High

I met Mrs Mji the principal of this school on 14 September. She was happy to hear about this project and for my considering Newell to be part of it. She was keen that her school be involved. She informed me that U.P.E was running a peer-coaching mathematics project with Grade 12 learners at Newell and that it was going well. As school was already out, she promised to give the proposal to her Biology teachers and to speak to them about this project. I telephoned her a few days later to set up an appointment with the Biology teachers. I met with Charles Makuwa and Helen Mandimo and shared the proposed project with them. They were keen and agreed to be a part of the team. We also discussed a sharing of information with regard to other classes outside this project.

Springdale Secondary

I met with the principal of the school on 19 September. As he did not have much time to speak to me due to another engagement, he referred me to his Biology H.O.D and stated that it was fine with him for the school to be involved with this research. The H.O.D, Michael (alias used) is someone that I know. He was excited about the project and said that he would encourage his teachers to be part of the research team. He stated that he was keen on new innovations. A few days later I met with Cindy (alias used) and Peter (alias used). They agreed to be part of the research team.

I was able to recruit 7 teachers from 4 different schools. A prerequisite for inclusion in this research team was that the teacher as co-researcher identified with the research to be undertaken. This study would investigate how cooperative learning could be developed to enhance the teaching of Biology at secondary school level. Teachers had to display a willingness to be part of a team to undertake research in this regard, with the aim of improving our practice as

teachers. I was extremely happy with the number of schools and willing teacher participants. I had decided that I would not approach any further schools at this point. I was keen to move on to the next step in the project.

3.4.1.3 Getting the Team Together

Now that the various schools and teachers had consented to being a part of my research, my next step was to try and use the rest of the time available to me in 1995 to prepare these teacher participants so that they would be able to take up their places as co-researchers, and as equal members of the research team. I had to bear in mind, as my personal experience has taught me that teachers in general have a fairly full programme between their academic and extra-mural activities. Furthermore, I was conscious of the fact that the team members were giving of their time on a voluntary basis. They would not be paid for their involvement, and as such, mindful of their normal teaching duties, I did not wish to frighten them off with any unrealistic demands. It was therefore my intention to make this transition from teacher to co-researcher as easy as possible for the rest of the team. I already prepared myself for the fact that I as facilitator would have to be prepared to drive the process. Although Action Research would in its true sense demand full participation by the team, I was aware that this research would probably be more important to me than to the rest of the team. I was aware that the mere identifying with the research problem in no way indicated that the teacher as co-researcher would be familiar with research methodology or the alternative teaching method being investigated in this research.

I decided that it would be best to get the team together as quickly as possible while everyone was eager to get to know a bit more about the project. I planned to call our first meeting before the close of schools at the end of September. Here I would formally launch the project. I would use my proposal as a guide to the research and would need to start an initial getting to grips in understanding key terms such as Action Research and cooperative learning. I telephoned the members of the team and scheduled our first official meeting for 27 September

1995.

3.4.1.4 Launching the Project: [First Meeting]

Our first meeting was held on 27 September at my home and started at 15h15. My home was in a fairly central position for all of us and I could more easily provide for refreshment from home. I had prepared an agenda for this meeting (see appendix 3). I had decided that the meetings would be run in a rather formal manner as I intended taking minutes of discussion and decisions which would form part of my data.

I warmly welcomed Shireez, Peter and Cindy who were present. I had received apologies from Helen and Charles who had other urgent engagements. Patricia was absent for this meeting. I presented each member with a file containing:

- An agenda for the meeting;
- A welcome letter from me to each member;
- 30 journal articles;
- A bibliography
- A note about the readings
  (see appendix 4)

We started with introductions where we formally introduced ourselves, sharing information about where we taught, the subjects we taught, etc. I provided general information about Helen, Patricia and Charles in their absence so that we could all get a better sense of the complete research team.

After the welcome and introductions, I addressed our group stating that we were at this our first meeting launching this project. It was for me personally an extremely exciting time as we were in the process of starting a project that had been in the planning stages for quite some time. It would seem that a lot of hard work in the preparation stages was beginning to bear fruit at last.

I explained to all present that we were embarking on an exciting venture. We were about to investigate an area in education that is relatively new. We were in fact about to break new ground and as such could be considered as pioneers in this regard. I also added that our results could affect not only our own teaching practice, but also the future practice of many other teachers. I tried to get the other members to see that they would be involved with a project that could make a significant contribution to teaching. This I thought to be important as for too long have teachers simply viewed themselves as persons who applied knowledge that has been generated by 'experts' out there. We ordinary teachers have not as yet in any serious manner begun to see ourselves as possible generators of knowledge. This launch was therefore important as it signified the beginning at least for our small group, of a transition from ordinary teacher to one of teacher-researcher. This attempt at face value may seem insignificant, but a deeper look at it shows that it is rather radical in that teachers are showing an interest in their own practice by attempting to generate knowledge for themselves. At the very least, we would be doing something quite different from our normal routine as teachers.

On a more personal level, I felt that it was necessary to make my position clear to the group with regard to the significance of this study for me. I reminded the team that the study to me was a requirement towards a PhD Degree. I did not want any misunderstanding with the team about this fact. However, I added that the study had greater significance in that we would all be contributing to improving teaching practice in general. I mentioned some of the advantages that we all could benefit from. This included:

- refocusing on our practice as teachers;
- refocusing on educational issues;
- experimenting with a new teaching method;
- application of cooperative learning to other grades;
- sharing of information amongst team members with regard to all aspects of

our profession;

- distributing our workload with regard to examinations, tests, practicals, etc.;
- possible publications with regard to our research.

At this stage our agenda called for brief comments from members regarding their views, opinions, frustrations, etc. with regard to the teaching process or education in general. I encouraged all to contribute with comments, suggestions, etc. No one was forced to offer comments at this stage. I found that as it was our first meeting, members were more inclined to want to listen to me about the research rather than wanting to make suggestions. In general there was consensus that we needed some revitalization in our teaching practice and that cooperative learning seemed to hold some promise.

I then moved on to give some background to the team with regard to what had transpired prior to our current meeting. I started from the point of my wanting to do a PhD degree and my contact with Rhodes University. I went on to mention several readings and the numerous draft proposals that ultimately led to my seminar presentation and final proposal. I attempted to share with the team that a lot had already been done prior to this our first meeting.

After all the discussion relating to the background of the project, we moved on to the proposal itself. Each member had a copy of the proposal. We went through the proposal so that each person would be familiar with the proposed plan of action for the research. I stressed that this was a proposal and that we as a team would be allowed to negotiate on aspects within the proposal as was in keeping with action research procedures. We would at a later stage get back to such negotiations when all of the team was more familiar with the two main aspects in this research, that is action research and cooperative learning. I did also mention that there may be some academic requirements that I would have to adhere to as far as my supervisor and Rhodes was concerned. This would have to be taken into account when we negotiated on aspects with regard to the research.

One of my key functions as facilitator was to get the members of the team to understand and be as familiar as possible with what I considered to be the main aspects dealing with this research, these being action research and cooperative learning. I therefore prepared a file for each member that contained 30 journal articles that covered topics on group work, cooperative learning and action research. Most of the articles focussed on cooperative learning. To make it easier for the team, I numbered the articles from 1 to 30 and prepared a bibliography in such a way that it started with the title of the article. In this way members would be able to scan the topics of the articles quite easily to see what appealed to them, when they were selecting for reading.

This large number of articles was sure to be intimidating to the team. I could imagine what thoughts ran through these busy co-researchers' minds when being presented with 30 articles at their first meeting. I therefore hastened to assure them that I was not expecting them to read all these articles. I went on to explain that I had provided this large amount of readings so that they could select and read articles of their own choice, that is articles that appealed to them. This was important and they needed to understand that they were being provided with an opportunity to form their own opinions with regard to the topics under discussion. They should therefore not feel that they were being led by my way of thinking or understanding. I did however guide them by stating that any of the articles numbered 1, 2, 3, 4 and 6 would be a good start for the topic of cooperative learning and that articles 26 and 28 would, in to my view give a good feel of what action research is.

I asked the members to read at least 2 articles on each of the topics so that they could start formulating their own ideas on them. I reminded them that they would not have to read as for an examination, but rather for understanding and with the aim of discussing their views at our meetings. The team accepted the readings in a good spirit and with the normal humour of a student being given a task, as in this case, an intimidating file containing 30 articles. They promised that they would read at least some of the articles. My plan in disseminating the articles at this

stage was to be able to get the team to read over the September vacation so as to save time in the final term. Also, interest in the project was high at this stage. I was sure that they would only be able to contribute meaningfully to discussion if they were familiar with these critical areas under discussion, that is, action research and cooperative learning. Negotiation could only take place then.

Before our meeting closed we decided that we would have our next meeting on 2 November 1995. At the second meeting we would discuss, amongst other things problems experienced with the readings (parts not understood, or needing clarification, etc), action research procedures and cooperative learning.

I promised that I would go and see all those who had been absent for the meeting so that they could be brought up to date with what had transpired. I would also take along their copies of the readings. Our rather long first meeting ended at 17h30.

Some of my general feelings after this first meeting were that I found the members who were present to be quite eager about the research. They seemed to have grasped the essence of the project. Members were not as yet ready to speak easily, but were prepared to listen attentively and showed that they were following the discussions by nodding to indicate agreement. Most of their contributions were either single words or short sentences. I also got the impression that our meetings would need to be shorter and possibly more frequent as members had other responsibilities besides their school work. Patricia, Helen and Cindy were working mothers, who in all likelihood would have many demands placed on their time after a school day.

I was a bit concerned about those who were absent, especially Patricia who had not tendered an apology. This our first meeting to launch or get started our research was an important point in the process. It therefore did concern me that certain members were not present to share this moment. I reminded myself that the rest of the team were sacrificing their limited time to be a part of this project

and that I should make every effort to seek out those who were absent so that I could personally update them on our progress. I would have to try and think of ways to keep everyone on board, as active participants.

At this stage I was already experiencing the reality of working with a team as compared to working alone. I acknowledge that on a personal level the project was probably more important to me that the rest of the team. My concern was "how could I make this project a priority for the rest of the team as well?". "What recourse would I have for non-attendance of meetings, absence of apologies, etc.?" These were concerns I had. I was also mindful that I would have to strike some balance so as not to frighten any member off. I would need to keep their interest while taking into account that the process was new to all of us. A few days after this meeting, I went to see Patricia. She assured me that she was still interested in continuing with our research project and gave a reason for not having attended the first meeting. I informed her about what had transpired at our meeting. I also visited Helen and Charles and brought them up to date as well.

3.4.1.5 Introduction to Action Research and Cooperative Learning: [Second meeting]

Our second meeting took place at my home on the scheduled date of 2 November and started at 15h00 with my welcoming the members present. I introduced Helen to the group as she had been absent from our first meeting. Helen shared a bit of background information about herself stating where and what she was teaching. I noted the following persons as being present: Cindy, Peter, Shireez, Helen and myself. Apologies were tendered for Charles who would be attending another sport meeting in Grahamstown and Patricia who had duty at her school with regard to a confirmation programme.

Each member was issued with an agenda (appendix 5). The agenda would deal specifically with the topics that we had agreed upon at our previous meeting. These included problems / questions emanating from the readings followed by a

discussion on the topics of action research, cooperative learning and cooperative methods. The team direction from the previous meeting was that we would read up on these key areas with the aim of discussing these areas at this our second meeting. This was part of the procedure to have the team familiarized with these key aspects of our research. It would seem that the way our research would be conducted would depend on the understanding that the team had with regard to action research. Further, if we were investigating a cooperative learning approach, then it was also essential to have a good understanding of this topic. Teachers in the team had their own view on this topic, although it was at this stage a superficial understanding. This meeting therefore was an extremely important one in laying a foundation for our future functioning within an action research framework.

I proceeded by asking if anyone had any questions or points to clarify with respect to either the previous meeting or the articles that were read in preparation for the meeting. No one raised any concerns that needed to be addressed at this stage. I was sure that if they had any concerns, these would probably surface during our discussions. I then proceeded by asking the team to briefly give their own understandings of what they perceived action research to be. The following then emerged:

Team's Initial Perceptions of Action Research

- research undertaken by us as teachers regarding our work
- a study undertaken to improve our teaching
- an intervention type of research
- a study undertaken in the natural setting, in our case the classroom
- research that can be undertaken by a group of people together
- research undertaken to test or evaluate what you are doing

As I had the opportunity to read fairly widely during the preparation of my proposal, I thought that I had a good feel for action research methodology. I was

thus impressed with these initial comments made by the team. It showed a fairly good grasp of this topic.

I suggested that we look at a few definitions of action research as presented by different researchers. I presented the following examples to the group:

> The study of a social situation with a view to improve the quality of action within it (Elliot, 1991:69).

> Action research is a form of self-reflective enquiry undertaken by participants (teachers, students or principals, for example) in social (including educational) situations in order to improve the rationality and justice of (a) their own social or educational practices, (b) their understanding of these practices, and (c) the situations (and institutions) in which these practices are carried out
> (Carr and Kemmis, 1986).

> Action research is small-scale intervention in the functioning of the real world and a close examination of the effects of such intervention (Cohen and Manion, 1994:217).

We then looked at the ideas that we had presented in relation to the examples of definitions that I had shared with the team. None of these ideas was in conflict with the above definitions. We identified more easily with the definition as put forward by Cohen and Manion as it reflected what we were doing and it was presented in a very simple way. I then suggested that we further note what Cohen and Manion regard as main features of action research. These are: situational, usually collaborative, participatory and self-evaluative. I then followed this up with a short description of each of these feature:

- *situational*

  it is concerned with diagnosing a problem in a specific context and attempting to solve it in that context.

- *collaborative*

  teams of researchers may work together.

- *Participatory*

  team members are involved directly or indirectly in implementing the research.

- *self-evaluative*

  modifications are continuously evaluated within the ongoing situation.

I then shared the following other features as suggested by Cohen and Manion (1994) that I thought to be important for the team. These included:

- relies heavily on observation and behavioural data
- during the project, information is collected, shared, discussed, recorded, evaluated and acted upon. This forms the basis of reviews of progress.
- the qualities of flexibility and adaptability makes action research workable in the school setting.

I then suggested that we look at all of the above ideas and definitions in relation to the action research spiral as put forward by Lewin suggesting the cyclical nature of action research. Here each spiral encompassed the four moments of planning, acting and observing, followed by reflecting. This exercise was important in that we could then take note of what we were doing in terms of the research design.

Figure 1: An action research spiral

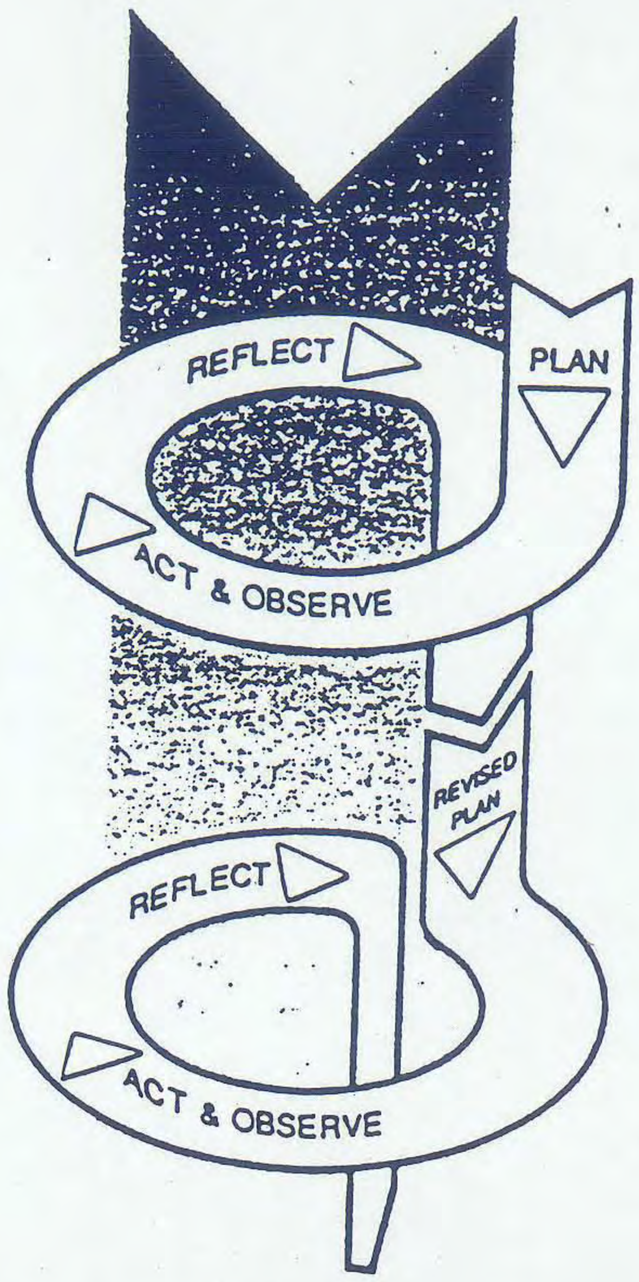

Figure 1: An action research spiral
Source: Kemmis, S., & McTaggart, R. (Eds.). 1992. The action research planner.

By this time, I felt that the team had a fairly good idea of what action research entailed for us to get started. Their perceptions were somewhat better than I had anticipated and I felt encouraged by this. I felt that with time and progress during the project, a deeper understanding would emerge. I suggested that we move on to the next topic for discussion, that is cooperative learning, and asked the group for their initial perceptions.

Team's Initial Perceptions of Cooperative Learning

- group work
- team work
- team of learners sitting and working together
- problem solving by learners in groups with teacher as facilitator
- structured group work
- non-traditional teaching method (teacher does not engage class in lecture style)

Source: Kemmis, S., & McTaggart, R. (Eds.). 1992. The action research planner.

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- structured group work
- non-traditional teaching method (teacher does not engage class in lecture style)

- learners helping each other in a group setting
- like group work used for projects

We then looked at a few definitions of cooperative learning:

> Cooperative learning is an instructional strategy in which students work together in groups that are carefully designed to promote positive interdependence (Abrami, Chambers, Poulsen, De Simone, D' Apollonia, Howden, 1995:1).

> Cooperative learning is a set of instructional methods in which students work in small, mixed ability learning groups (Slavin, 1987:8).

> Cooperative learning involves learners working together and being responsible both for their own and each other's learning (Brombacher, 1994:1).

As a group, we identified with these definitions understanding that cooperative learning was more than merely sitting together. It is an approach that is structured to facilitate work by and individual and the entire group. I presented the team with the following key features within cooperative learning:

- positive interdependence
- that every learner contributes
- that students work constructively, helping each other
- individual accountability and personal responsibility

It was clear that while all of us had used group work to varying extents in the past, we had not in reality engaged in cooperative learning as outlined by the definitions discussed.

It was beginning to get rather late and it seemed unlikely that we would be able to complete the entire agenda. We had spent quite a bit of time on the above two topics. In a way that was good as these were important aspects within this research. I suggested that we carry over the rest of the agenda dealing with different cooperative methods to the next meeting. I suggested that the team

again read up on article number 21, pages 31-34 for the next meeting. We reached consensus on our next meeting being scheduled for 29 November at 11h00. I thanked everyone for their attendance and participation and closed the meeting at 16h45.

In general, I thought that the team was progressing very well. Members could relate to the information especially when it was linked directly to our teaching practice. I felt that the team had a good idea of both topics, that is, action research and cooperative learning.

3.4.2 Negotiating Implementation: [Third Meeting]

The meeting took place at my home on 4 December 1995 at 11h00. The original date of 29 November was postponed due to examination marking deadlines that had to be met by some members of the team. I welcomed all and introduced Patricia to the other members. This was her first meeting of the research team. I gave her an opportunity to give us a brief background of herself with regard to her teaching. Members present included Cindy, Peter, Helen, Patricia and myself. Apologies were tendered by Charles who was busy at school and Shireez who was busy with her forthcoming wedding preparations.

We all had copies of the agenda. The main focus of this meeting was to familiarize ourselves with some of the widely researched cooperative methods. This point was being carried over from the previous meeting. Hereafter we would be negotiating on several issues relating to how our research would be conducted. Part of our preparation for this meeting entailed going over certain readings dealing with cooperative learning methods. Due to the fact that we were going well over our allotted times in the previous meetings, I prepared a handout for each member of some of the widely researched cooperative learning methods. These included STAD, Jigsaw, Jigsaw II, Learning Together and Group Investigation. Each member received a copy of this handout and we proceeded to going over these cooperative learning methods.

I listed in point-form the main characteristics and procedures for each of these cooperative methods. This would I thought make it easy to follow. The idea was that we would go over each of these methods taking note of how they differed from each other. We would as a team discuss and select a cooperative method to use in our research. These methods as well as the agenda are further described in appendix 6.

3.4.2.1 Team Negotiations

We had reached the point in our preparation where we were now in a position to discuss and negotiate on aspects relevant to our research.

The Cooperative Learning Method

Our discussions with regard to selecting a cooperative learning method led to quite a vigorous debate. Patricia in particular was very vocal on this issue. She put forward a case for our cooperative lessons to be very informal, “like a game”. She based her point of view on past group work experience she had with her religious instruction classes. She had found this informal group work to work well in her classes. The rest of the group however was reluctant to accept an informal approach. One factor that was mentioned to reject the suggestion was that the religious instruction spoken of was not at this time used as an examination subject. Because Biology, our subject, is an examination subject we (the rest of the group) favoured a more structured approach. It was felt that we should not leave learning by the learners to chance, but that we should structure lessons to ensure that learning does in fact take place. Structure here was clarified as to mean peer-tutoring, peer-coaching, drilling, and making learners responsible for their own and each other’s learning. It was mentioned that it seemed that a purposeful dynamic interaction was needed between learners in the group. This was perhaps the key to success within cooperative learning methods. At this stage, I think that we were all still being rather conservative in our thinking. This is largely due to our history of being examination oriented.

Most of us opted for the Jigsaw II method. One major difference between Jigsaw and Jigsaw II is that in Jigsaw II the whole group reads a common passage or chapter before learners are given different topics individually on which to become expert. In Jigsaw, material is broken down and individual learners are given topics on which to become expert, that is, they do not read the whole chapter together, first. This also elicited different views within our team. Should group members (learners) see the whole chapter or just their piece of the jigsaw? Patricia felt that if the learner sees the whole, it could lead to boredom, lack of interest, or loss of surprise. The rest of the team felt that the learner would benefit if he/she saw how the part of the jigsaw fitted in the whole. The jigsaw piece seen in context would provide more meaning to the learner. We opted for the group reading the whole chapter before having to master parts of it.

A further difference emerged when Patricia suggested that a group should present the lesson to the whole class as opposed to group members presenting their parts of the jigsaw to their own groups. This was rejected as the rest of us felt that the suggestion by Patricia would greatly reduce the amount of interaction between members of each group and thus within the class. It would allow for certain learners to not pay attention and to become free- riders. We were keen on the coaching or peer-tutoring that would take place to ensure that others in the group understood each part of the jigsaw. We anticipated that this would build self-esteem and that it could motivate the learners. We eventually compromised by accepting Jigsaw II with its coaching/tutoring component, but included an overall presentation of the entire chapter to the whole class at the end of the chapter.

The negotiation with regard to the cooperative method to be used was in my opinion quite a difficult hurdle to overcome. I could easily identify with the group's decisions. We were embarking on a research project with our own learners in our own schools. We all would ultimately still be accountable for what progress our learners would make. All of us in the team are quite conscious about results and examinations. It is for this reason that we largely preferred being more

conservative in our choice of a cooperative learning method. To overcome any sense of feeling that one's views were not accepted during this negotiation, I reminded the team of the spirals within the action research procedure. We would be in a position to modify or change our strategy as the need arose when we reflected on our plan of action. We were not binding ourselves to these decisions for the entire duration of the research. We were in fact only committing ourselves to a starting point. This served to reassure the entire team that we were not embarking on a road on which we could not turn back or change direction.

The Grade to be Taught

Our team was already formed on the basis of us teaching Grade 10 Biology in 1996. We accept that we would not therefore now renegotiate any other grade. It would have been logistically a major problem in putting together a team if we had not identified a particular grade-grouping for the research in advance.

Proportion of Syllabus for Cooperative Lessons

We reached consensus that we should select at least half our of our prescribed number of chapters to teach in a cooperative style. We acknowledge that all the chapters would not be of equal length or difficulty. After looking at our syllabus for Grade 10 Biology, we decided that it would be best to select chapters that seemed better suited to group work. After looking at each chapter as laid out in a textbook titled Exploring Biology, and written by DuToit, we eventually selected the following chapters: 1, 2 and 3 dealing with ecology; 5 with anatomy of angiosperms; 7 with mammalian tissue and 9 with the blood system. We took note of the fact that our four schools were utilising three different textbooks. We were however all following the same syllabus. We would work out a way to overcome any problems with regard to the textbook issue.

Division of Work

We agreed that the workload would be spread amongst the four participating schools. This would help to ensure that all of us participated fully. All of us had a stake in this research. We agreed that chapters 1, 2 and 3 could be merged to form one unit. We therefore most conveniently ended up with four units to be shared amongst our four schools. It was suggested that each school select a chapter for which they would assume responsibility. We selected in the following order: St. James selected Anatomy of Angiosperms; Newell selected Mammalian Tissue; Springdale selected The Blood System and Paterson agreed to take the remaining chapter on Ecology.

When to Start Implementation

We agreed that our team would probably still need more discussion and preparation at the beginning of 1996 and that it would be best to start with traditionally taught lessons. We surmised that we would most likely be ready to start with the cooperative learning method by late February 1996. I also reminded the team that we would need some time at the beginning of the year to prepare our learners for cooperative learning.

After successfully negotiating these aspects within the team, I proceeded to discuss with the team how and why we should adequately prepare our learners for the forthcoming cooperative lessons.

3.4.2.2 Preparing Learners for Cooperation

The learners in our [research team] schools are taught by teachers who generally use the traditional teaching method exclusively. This means that both learners and teachers need to be prepared for groupwork or cooperative learning. Cohen (1994:39) states that it would be a great mistake to assume that children (or adults) naturally or automatically know how to work with each other in a

constructive collegial fashion. Students must therefore be prepared for cooperation so that they know how to behave in the groupwork situation without direct supervision. A training programme will construct new norms or rules for how one ought to behave.

Cohen (1994:40) further points out how norms differ within the traditional and groupwork structures. In traditional classrooms students are encouraged to: do their own work; not pay attention to what other students are doing; never give or ask for advice from a fellow student; pay attention to what the teacher is saying; keep their eyes towards the front of the room; and to be quiet. Assigning groupwork involves a major change. Now the student is encouraged to: depend on other students; be responsible for their own behaviour and the group's behaviour; listen to other students instead of the teacher; ask for other people's opinions; and to give others a chance to talk.

The following points taken from different readings is part of a handout I prepared for the team to consider when preparing classes for cooperative learning structured lessons:

- learners must be prepared for cooperation so that they know how to behave in the groupwork situation without direct supervision.
- learners need to understand the purpose in introducing groupwork, and why groupwork skills are important.
- setting up the classroom is the first step in preparing for cooperative learning.
- arrange the desks or tables in clustered groups.
- if this arrangement cannot be permanent, set norms for moving desks quickly and quietly.
- a time limit, made clear to learners must be set for each lesson/activity.
- there is no reward for finishing first, the idea is to complete the work and to do it well.
- once assigned, learners should work in the same group for several weeks

to allow for development of a group identity and team spirit.

- in the Jigsaw classroom, the role of the teacher changes significantly from agent of control and disseminator of all knowledge to catalyst and advisor.
- the teacher is free to offer assistance and individual attention to those who need it
- each member is accountable to him/herself as well as the group
- dominance must be prevented by everyone in the group:
  - ✓ giving their own ideas.
  - ✓ listening to others.
  - ✓ giving everyone a chance to talk.
  - ✓ asking others for their ideas.
  - ✓ giving reasons for your ideas.
  - ✓ discussing different ideas.

After our team shared some ideas about preparing our classes, we accepted that this was an important aspect and that we would work on ways to prepare our classes taking into account that each class will be unique and require more or less preparation than the other. We further agreed that we would prepare simple assignments prior to our first cooperative chapters in order to give our learners an opportunity to develop the skills necessary for groupwork. These exercises will be of short duration, a few minutes only, so that the results could be monitored and rectified immediately.

By this time, we were all quite tired. We agreed that we would meet again during the second week of 1996. This was therefore our last meeting of 1995. I thanked the team for their unselfish participation and wished them well for the holidays. I also asked them to read articles numbered 18 to 21 when they had a chance to do so. I closed our final meeting of 1995 at 15h00. This meeting had provided a few tense moments for me during the negotiation stage. I found that being co-participant and facilitator does require special skills. I tried hard not to impose my views. This became difficult as I had read much more than the team on the topics

under discussion. I had also spent much more time when preparing, and thus have a deeper understanding of the issues. I was however extremely grateful for the participation and contributions being made by the team. These teachers were willing to give of their time in spite of the demands being placed on them in the course of their normal duties.

3.4.3 Data Collection [Fourth Meeting]

3.4.3.1 Introduction

Our team gathered at my home for the first time in 1996 on the 7 February at 15h00. It would be an important meeting as we were getting closer to implementing our research. We had spent close on four months in getting to this point. I was hoping that the entire team would still be in tact. The beginning of our school year is sometimes problematic when finalising class groupings and teaching allocations.

I welcomed Helen, Cindy and Shireez. I had received an apology from Patricia who had to attend a class at UPE. Cindy informed me that Peter would no longer be part of the project as he was not allocated any Biology classes for 1996. Helen informed us that Charles too was not going to teach Biology in 1996. In both cases, this was the result of restructuring taking place at their schools. I was disappointed in losing Peter as he had been so energetic and enthusiastic at the past meetings. Charles had not managed to attend any of the previous meetings. Helen and I tried to keep him updated with our progress. His busy schedule (sport administration) did seem to make him a doubtful starter. This again alerted me to the fact that I could not predict with any certainty how things would turn out. The fact that I was working with a collaborative team, on whose voluntary participation I depended brought with it a certain amount of uncertainty. See appendix 7 for the agenda of meeting 4.

If there could be any positive side to losing two members of the team at the

beginning of the year, it was that we still had all four schools involved with the project. This was due to Helen and Charles being from Newell and Peter and Cindy being from Springdale. I was glad that we had not lost the participation of a school.

I started by telling those present that we had arrived at the point that we had been working towards for the last few months, that is, the year in which we would implement our research. We had been talking about it and preparing for it for quite some time. I personally was both excited and anxious about the project at this point.

I again thanked the team for being willing to continue being a part of the team. I made an effort to be positive about their participation and contribution. I acknowledged the fact that teachers are generally busy. I appealed to all to do their best so that we could stay on schedule. I again reminded the team that we were planning to run the research over one academic year only, and that it was crucial to be focussed. We should try our best with our planning and preparation so as to avoid neglecting to do anything that we feel to be important to us. I acknowledged that it would be a different year, possibly more difficult with the additional work, but I was hopeful that we would all benefit from the research.

We resumed the agenda and I asked the team to provide information with regard to their Grade 10 Biology classes for 1996. The following was reported:

- Shireez, 2 classes with 26 and 27 learners per class
- Sivan, 3 classes with 26, 38, and 39 per class
- Helen, 5 classes with approximately 45 per class
- Cindy, 5 classes with approximately 43 per class
- Patricia, 3 classes with approximately 40 per class.

This class spread showed that at least 15 of the class groups were large. These classes exceeded the anticipated size of 35 learners. The results of our

Education Departments restructuring and rationalization was already beginning to make its presence felt in the form of these large class groups. The fourth point on our agenda was the most important for this meeting. It dealt with data collection techniques. We had not covered this important aspect in the previous meetings. I would discuss various data collection techniques with the group so that we would be able to select techniques to be used in our study. Other topics for discussion included preparation and discussion of lessons for the fist term, examinations and preparing our learners for cooperation.

3.4.3.2 Data Collection Techniques Considered

This was another area in which the research team needed preparation. Action research uses techniques that are common to many other forms of qualitative inquiry. It does not have a unique methodological process (Stevenson, 1995).
I had prepared a handout for our group on data collection techniques. I mentioned to them that I had used two particular books to prepare this handout, these being, Elliot's (1991) *Action Research for Educational Change* and Ely's (1991) *Doing Qualitative Research: Circles Within Circles*. I had selected techniques for discussion that were consistent with action research procedure. I introduced this discussion by asking the team to take note of the following:

- We would need to use monitoring techniques that provide evidence of how well our course of action was being implemented;
- These techniques should provide evidence of unintended as well as intended effects;
- Our techniques should enable us to look at what is going on from a variety of angles or points of view.

3.4.3.3 Diaries / Logs

- It should contain personal accounts of observations, feelings, reactions, interpretations, reflections, hunches, hypotheses, and explanations.

- Accounts should not merely report the 'bald facts' of the situation, but should convey a feeling of what it was like to be there participating in it.
- Anecdotes; near-verbatim accounts of conversations and verbal exchanges; introspective accounts of one's feelings, attitudes, motives, understandings in reacting to things, events, circumstances; all help to reconstruct what it was like at the time.
- The log is the repository of all the data gathered. Transcripts of interviews and videotapes form part of it. Print materials that are bulky can be cross-indexed and stored.
- It is a chronological record.
- It is an expansion of field notes, (those rapid jottings or whisperings in tape recorder of details and dialogues that serve as guidepost for fuller description).
- The log is the data. Detail is everything.
- Learners could also keep diaries. This enables a teacher to compare his experiences of the situation with that of the learners.
- Learners and teachers can hold periodic evaluation sessions after each party had read back through the diaries to support the views expressed.
- Diaries should be properly dated. Details like grade, time, subject should be cited at the beginning of an entry. Entries may vary in length and amount of detail. They should be fullest at those points where the heaviest monitoring and reconnaissance is planned.
- Keeping a diary is necessary a personal and private matter, the disclosure of its contents should be under the control of its author. There should be no compulsory collecting in of diaries.

3.4.3.4Profiles

A profile provides a view of a situation or person over time. In a teaching situation one can produce profiles of lessons, or the performance of certain learners.

3.4.3.5 Document Analysis

Documents can provide information which is relevant to issues under investigation. Relevant documents could include:

- syllabi and schemes of work
- curriculum
- examination papers and tests
- minutes of departmental meetings
- sections used from textbooks
- samples of learner's written work

3.4.3.6 Photographic Evidence

Photographs can capture the visual aspects of a situation. These would include:

- learners working on classroom tasks
- physical layout of classroom
- pattern of social organization in the classroom, learners working in groups, or in rows facing teacher

3.4.3.7 Tape / Video Recordings and Transcripts

- Tape or video can be used to record lessons in whole or in part.
- When used by the teacher (or learner), it can be distracting, although this may diminish as the user becomes more skilful.
- Fixed-cameras may not pick up certain things which are relevant and important.
- Portable tape-recorders with built-in microphones are less distracting.
- A teacher will probably get more out of a recording if he/she listens to it, and then transcribes interesting and relevant episodes. This enables him/her

to move backwards and forwards through an episode more quickly and easily than constantly playing the recorder backwards and forwards.

- Transcribing by hand is immensely time consuming, though well worth the effort.

3.4.3.8 Using an Outside Observer

- This technique can be useful if the outsider is well briefed by the insider, so that he/she knows the sort of information that will be useful.
- Information can be collected in the following ways:
- taking photographs and then passing them over (perhaps with comments)
- making a video recording and showing the teacher excerpts he/she feels to be significant.
- making detailed notes as he/she observes, and using it as basis for a short report for the teacher to read.
- allowing the teacher to interview him/her.

3.4.3.9 Interviewing

Qualitative research provides a great many opportunities to talk with people.

- It is purposeful conversation.
- Interviews seek the words of the people we are studying, so that we can understand their situation with increasing clarity.
- It is a good way of finding out what the situation looks like from other points of view.
- In the context of classroom action research, a sample of learners should be interviewed frequently. Eliciting 'authentic' accounts from them is not easy initially, given a teacher's authority position.
- Interviews can be structured, semi-structured, unstructured:
- *structured* - questions are preset by the interviewer.
- *unstructured* - the initiative for raising the relevant topics and issues is left

to the interviewee.

- During the initial stages of action research, when one wishes to remain as open as possible on the question of what information is relevant, an unstructured format is probably best.
- A *semi-structured approach*, where the interviewer asks certain preset questions but allows interviewees freedom to digress and raise their own topics as the interview progresses is probably better than a rigidly structured approach.

3.4.3.10 Running Commentary

- In teaching situations one useful application of this technique is when observing a learner or group of learners working at a task.
- Observations should continue for a least five minutes.
- Do not intervene in the task learners are engaged on.
- Sit as near as possible, line of vision at different angle, avoid sitting face to face.
- Try to write down as literally and concretely as possible everything said and done. Note things like tone, gesture, etc.
- Keep commentary as descriptive as possible, avoiding judgements and high-level interpretations from which it is difficult to tell what was actually happening.

3.4.3.11 The Shadow Study

- A participant is 'shadowed' for a period of time, and a continuous running commentary made of his/her actions and reactions.
- In a classroom situation the person shadowed could be a teacher or learner.
- The observer may be an external consultant or on-site colleague. It could be shared by members of an action research team.
- Observers should be briefed on the kinds of things to look for and their reports

made available to the action researchers.

3.4.3.12 Checklists, Questionnaires, Inventories

- Checklists are basically sets of questions one answers oneself.
- They structure observations by indicating the kinds of information needed to answer the questions.
- An exclusive reliance on checklists can blinker one to unanticipated effects of actions, and factors in their context may explain these effects.
- Checklists should always be used in conjunction with more open and less structured techniques of monitoring, e.g. recordings, free observation, running commentaries, unstructured interviews.
- A questionnaire is basically a list of questions one wants to ask other people.
- Questionnaires and inventories allow one to quantify people's observations, interpretations and attitudes. They should be used as follow-up techniques to more qualitative ones.

3.4.3.13 Triangulation

- It is not so much a technique for monitoring, as a more general method for bringing different kinds of evidence into some relationship with each other so that they can be compared and contrasted.
- The basic idea is that of collecting observations/accounts of a situation from a variety of angles or perspectives, and then comparing and contrasting them.
- A teacher can compare and contrast accounts of teaching acts in the classroom from one's own, the learners' and observer's point of view. The points where they differ, agree and disagree should be noted.

3.4.3.14 Analytic Memos

- Analytic memos contain one's systematic thinking about the evidence one has collected and should be produced periodically, normally at the end of a period of monitoring or reconnaissance. These memos may record:
- new ways of conceptualizing the situation under investigation which have emerged.
- hypotheses which have emerged and which one would perhaps like to test further.
- citations of the kind of evidence you need to collect in the future, in order to 'ground' emergent concepts and hypotheses more fully.
- statements about emerging problems and issues within one's field of action.
- the analyses contained in these memos, which may be as short as one or two pages, should be cross-referenced to the relevant evidence on which they are based.

3.4.4 Data Collection Techniques Selected

The team discussed the above data collection techniques with the aim of identifying those techniques to be used to obtain the data or evidence for our study. Some of the concerns raised was the amount of time we would have available to carry out these observations. There was a sense of being cautious to commit to doing something that persons in the team felt they may not be able to follow through. This in itself did not disturb me as I could sense that members in the team did not want to disappoint me by not fulfilling any agreed upon decision. I then suggested that we look at those techniques that were absolutely necessary for the research. I suggested that the log/diary was a data collection technique that was essential. This would enable us to record our observations in our own classes when implementing our research. It would seem that all observations or views obtained would in fact form part of the log. One concern was that teachers did not want to find themselves worrying about recording in their diaries whilst they had to still take responsibility for what was going on in the classroom. We

eventually agreed that we would record as much or little as time would allow when observing during the implementation of the cooperative lessons. Further, we would at least on a weekly basis make a more detailed recording of what has transpired in our classes. The information from these entries would largely be used as a basis for reporting and discussion at our team meetings. These observations would be critical when we as a team reflected on our plan of action that was implemented. This would then in turn justify our revised plan of action within the action research spiral. We agreed that our style of keeping a log would be personal or unique for each of us, as we would make recordings in a way that each was comfortable with.

We further agreed on interviews and questionnaires for learners and/or teachers. We agreed that learners would need to be interviewed so that we would be able to know what their views are with regard to the research. This would have to take place at different times of implementation within the action research spirals. These learner views would form part of the log to be reported during team discussion. Learners would at the end of the research be surveyed with a questionnaire. This could also be followed up with interviews. Teachers of the team did not object to their being interviewed with regard to the research.

We also accepted that photographs and recordings by tape or video should form part of our data collection. We would try to at least record our learners on two occasions. We were concerned about our learners' behaviour for recordings as it would not be something to which they are accustomed. We did not want our learners to 'perform' and thus create an unnatural situation in the classroom.

I concluded this section by again reminding the team we could revisit these data collection techniques if and when necessary during our recordings of what transpired in our classes. An action research process would allow for this. We then proceeded to the next point on the agenda. Shireez and I were responsible for preparing the materials with regard to our first cooperative chapter to be implemented. I suggested that Shireez and I present our preparation in a

workshop fashion to the rest of the team. This would give us all an opportunity to be familiar with what will be implemented in the classroom. We would all also then have an opportunity to suggest any changes if we felt the need for change. The team was amenable to the idea of a workshop. We took a long time to find a suitable date and eventually agreed on Saturday 17 February for this workshop.

I proceeded by telling the team that Shireez and I would use the syllabus as a guiding and uniting factor when preparing the first cooperative chapter. This was important as we were not all using the same textbooks. I then went through a list of topics asking members their opinions with regard to the depth each topic be covered. They responded by informing how they had done certain work in the past. We agreed that the final product would in a way be a compromise as we all generally add our own personal touch to our teaching. The school preparing a specific chapter will need to consult the various textbooks in use by members of the team. Where a specific section in a textbook seems inadequate, copies from other books will have to be supplied to that teacher. We would each try and obtain extra copies of our school's Grade 10 Biology textbooks to circulate within the team. Another problem that surfaced was that Newell had a much shorter teaching period due to their working on a different cycle. They would however have more periods than the rest of us. We also anticipated disruptions as the first term is generally characteristic of shortened periods due to athletics, etc. We agreed that we would implement the research as best as circumstances at our schools would allow and make our recordings accordingly.

I moved on to the next topic that dealt with our schools possibly writing a common examination, or at least on the cooperative sections completed by us. We did not reach any agreement and would revisit this topic at a later stage.

I reminded the team about continuing to prepare our learners for cooperative work. They need to have certain skills that will enable them to work well within a group arrangement. I again referred the team to article 12 in our readings that specifically dealt with this topic. I also reminded teachers to check for extra copies

of their Biology textbook so that these might be shared within the team. I thanked the teachers for attending the meeting, their patience and perseverance. I closed the meeting at 17h30.

I was satisfied with the progress that we were making. We were slowly edging towards implementing our research. I was grateful for the teachers of the team who continued to offer their time for this project. I thought that the team had a good understanding of the data collection techniques that were discussed. I however did imagine that the actual collecting of data would be much more difficult than we were expecting it to be. This is possibly due to us as teachers not having experience as far as this is concerned. Also, I sensed that the keeping of a log was going to be a challenge to all of us.

3.4.5 Workshop to Finalize Cooperative Materials for Cycle 1: [Fifth Meeting]

Shireez and I were responsible for preparing the materials for our first cycle. After our fourth meeting of the team, the two of us got together in the afternoons to discuss and develop the materials on the chapters dealing with ecology that we would present to the entire team at a workshop planned for 17 February 1996. We used the syllabus as a guide and took note of what information was available in the various textbooks being used by the schools within our study. Information available in the textbooks was an important factor as this would be a primary source of information for learners. We firstly identified the various topics or areas that had to be covered in this chapter. Thereafter, we divided these areas into lesson units. We were aware that some lesson units could possibly run for longer than a class period. Our aim was to group the work into manageable units that dealt with complete sections of work.

We eventually completed our preparations, ending with 18 lesson units in this chapter of ecology. Each lesson allowed for an introduction by the teacher and stated exactly what learners in the group would need to do. In most cases the

lessons were a compilation of several questions that learners had to answer. Lesson units were divided into questions catering for a 4-member learner group. In keeping with the jigsaw method that we were using, each learner would be given a specific section (question/s) to work out. These questions would thus serve as a basis for discussion within the groups. We were now ready to present our materials on this chapter to the entire team at the workshop that was scheduled for 17 February. See appendix 7b for the agenda.

Ecology Workshop

The team got together on the morning of Saturday 17 February at 10h00. The following persons were present: Shireez, Helen, Cindy and Sivan. Patricia had tendered an apology. I started by welcoming everyone and thanking them for availing themselves on this Saturday morning.

I started with an explanation of how we could run this session. I handed out a copy of the lesson plans to each member together with summary of the topics covered in these lessons. I suggested that Shireez and I would make a few general comments and proceed by going over each of the lessons. Everyone was at liberty to discuss any point of the lesson, making suggestions, asking for clarification, etc. The aim was to end up with lesson plans for presentation to our classes that the entire team felt comfortable with. The structure was open for negotiation at all times. The group accepted this suggestion and allowed Shireez and I to proceed.

By way of introduction I stated that the questions set for each lesson should in no way limit the teacher's individuality or creativity. Teachers were at liberty to add any further information or questions. This we felt to be important as each teacher would have to take into account their unique circumstances, especially their learners. The set questions were simply a way of uniting our various schools in terms of application of the work. Teachers would have to assist their learners who have questions, or those needing clarifications, etc.

When using the lesson plans presented, we stated that the teacher should at all times remember the following:

- the teacher must at all times encourage and reinforce the cooperative goal structure;
- learners should be mutually dependant on each other;
- peer coaching / drilling and testing of each other within the learner group is an integral part of the lesson;
- the learning process is therefore not restricted to the classroom;
- the teacher must give a clear indication as to when a task should be completed;
- learners should be reminded regularly of their responsibility and accountability to both the group and themselves.

The following are the lesson plans that were presented to the team at this workshop:

[These lesson plans have been included in this section as it forms an integral part of our developing a cooperative approach to teaching Biology to our Grade 10 learners. These lesson plans indicate how work had been divided for members of a cooperative team and the role of the teacher during these lessons.]

Lesson 1

Teacher: - Introduces chapter on ecology (general discussion)
- Ecology can be studied at different levels, i.e. biosphere, biome, ecosystem, community, population or organism.
- We will be studying it at ecosystem level.

Learners: - Seated in their groups (4 members)

1. - Group as a whole taking turns discuss reasons why ecology should be studied, i.e. the importance of ecological studies.

- Group lists the reasons given by each member.
- Various groups take turn to orally present their lists to the teacher.
- Teacher makes a comprehensive list on board or transparency.
- Learners add to their list any additional information.

2. - Learners are asked by teacher to picture in their minds an ecosystem (school ground, specific area, etc.)
   - Generate a list of all things that could be found in this ecosystem.
   - List factors that could affect / influence this ecosystem (teacher could give guide / example, - wind)
   - Responses again presented by each group to the teacher and comprehensive list compiled.
   - Learners add to the list and record in their workbooks.

Lesson 2

Practical investigation and application of what was discussed in lesson 1.

Teacher briefs learners on the activity for the day.

Learners taken out onto school ground or nearby site for investigation of possible ecosystems. They remain in their groups and have with them (at least one in the group) writing material, pencil, etc.

Learners are to:
- identify an ecosystem that could be monitored throughout the year.
- list all found in the ecosystem
- identify factors that can/will influence it

Groups return to class and present their findings to the teacher, who makes a summary of this information.

The class then selects one or two of the best ecosystems for an investigation

throughout the year as required from time to time.

Lesson 3

- Learners seated in their groups.
- They are asked to look up and discuss the terms biotic and abiotic.
- Groups refer to their notes from previous lesson on ecosystems and classify all noted in the ecosystems under these headings of biotic and abiotic.

- Groups are asked to distinguish between the terms:
  Physical Factors
  Physiographic Factors
  Edaphic Factors

Findings are presented to the teacher who guides the class in distinguishing the differences here.

- Groups now classify all their listed abiotic components under these mentioned categories.

Teacher guides learners and fill in with learner's assistance all those factors to be studied and possibly not supplied by learners.]

Learners record this in their work books.

Lessons 4 & 5

Physical Factors / Climatic Factors

- Each member of the team receives one of the following physical factors for investigation and discussion:
  Light, Temperature, Water, Gasses/Wind.

Learner 1 - <u>Light</u>

a. Where does light come from? What is its source?

b. What is the role pigments found in the skin?

c. List some adaptations of plants and animals with regard to light.

d. Explain the terms: phototropism and photoperiodism

Learner 2 - Temperature

a. Discuss how temperature affects poikilothermic (cold-blooded), and homoiothermic (warm-blooded) animals.
Mention the adaptations in the animal's lifestyles.

b. How does temperature affect plants?

c. In summary, how does temperature affect the ecosystem?

Learner 3 - Water

a. What are the uses of water in nature?

b. Is its distribution equal for e.g. throughout South Africa? If not, how is this problem overcome (if at all)?

c. Discuss the movement of water as shown in the water cycle.

d. Distinguish between the following, with an example of each:
Hydrophytes, Mesophytes and Xerophytes

e. List a few examples of how animals adapt to a shortage of water.

Learner 4 - Gases / Wind

a. Name the important gases found in the atmosphere and list a function of each.

b. List a few adaptations of plants and animals with regard to gases.

c. What role does wind play, especially in the lives of plants?

Lesson 6

Physiographic Factors

The following physiographic factors are to be studied and discussed by group members: situation/position; slope; altitude/height above sea level
Teacher can introduce the lesson by again recapping what the term physiographic means.

Learner 1 - Situation/position

a. Explain how the direction of the slope with regard to the sun affect plant growth.

b. What affect does the plant life in turn have on the animal life?

Learner 2 - Slope

a. Explain the types of plant and animal life that would be found on slopes that are gentle, moderate and steep. Give reasons for your response.

Learner 3 & Learner 4 - Altitude

a. Explain what affect air pressure, humidity and temperature has on plant and animal life.

Lesson 7

Edaphic Factors

Learner 1 & Learner 2 - Classification / types of soil

a. How is soil formed?

b. Name the different types of soil.

c. How can one distinguish between these different types?

Learner 3 & Learner 4 - Other qualities of soil:

a. Explain how the following characteristics of soil affects plant and animal life:

- colour
- texture
- pH

b. Explain what the addition of humus does to the different types of soil.

c. Distinguish between the different types of water in the soil. Which is most useful to the plant?

d. What gasses are found in soil and what are their uses?

Lesson 8

Practical - Waterholding-capacity of soil

Learners will work in their groups. If your equipment is sufficient, allow each group to do their own investigation and compare results later on. An alternative is to combine groups or we could borrow apparatus from each other.

Learners can read up and conduct the experiment as shown in their text books:

Active Biology - page 31 (Newell)
Biology 8 - page 61 (Springdale High)
Exploring Biology - page 21
Senior Biology - page 18

Learners will make drawings of apparatus as in experiment and record all data, i.e. before and after experiment conducted.

Teacher will guide learners where necessary

Lesson 9

Practical - Airholding-capacity of soil

The same procedure will be followed as in period 8.

Active Biology - page 26
Exploring Biology - page 17
Biology 8 - page 62

Lesson 10

Introduction: Biotic Components

Teacher introduces the lesson, as we are beginning the section on the biotic components of the ecosystem. Again it should be stressed that we are looking at the inter-relationship between the biotic and abiotic components of an ecosystem. This lesson aims at introducing the learners to the different biotic components - change in terminology from previous encounter with biotic community.

Learner 1 - Terms: Biotic ; Producers

a. Who or what the biotic components in an ecosystem?

b. Explain why you think the biotic component would not survive without the abiotic.

c. What are producers?

d. What do you think would happen if there were no producers?

Learner 2 - Terms: Autotrophic ; Heterotrophic

a. What does the term autotrophic mean?

b. Who or what are represented by the autotrophs?

c. What do you think would happen if all the autotrophs disappeared?

d. What does the term heterotrophic mean?

e. List the different types of heterotrophs.

Learner 3 - Term: Consumers

a. Why are consumers so called?

b. Distinguish between the different types of consumers: primary, secondary and tertiary. Give examples as well.

Learner -Terms: Herbivores ; Carnivores ; Omnivores ; Decomposers; Scavengers.

a. Show how each of the above-mentioned differ in the feeding patterns.

b. Give examples of each.

c. What do you think would happen if there were no scavengers and/or decomposers?

Lessons 11 & 12

The following 2 lessons will deal with different feeding interactions. Because it is perhaps better to let the learner work through one pattern completely, it will be done over 2 days. The first will be to summarize and internalise as well as clarify with the expert group. The second for peer coaching/drilling in group.

Learner 1 - Food chains

a. What are food chains?

b. What is being transferred from one organism to the next in a food chain?

c. Why do you think energy is lost with each transference?

d. Which food chains, i.e. longer or shorter ones, have more energy available?

e. list a few food chains that consist of producers, primary consumers, secondary consumers, and tertiary consumers.

Learner 2 - Food webs

a. What are food webs?

b. Why do you think food webs occur in nature?

c. Complete the following example of a food web. Do a little research to make it as accurate as possible as it would occur in nature.

Learner 3 - Ecological pyramids

a. What are ecological pyramids?

b. Name the different types of ecological pyramids. Make simple diagrams of them.

c. Study the pyramid of energy or numbers:

- Why can't the order be reversed? i.e. producers in the mall top triangle and tertiary consumers in the large bottom triangle.
- What would happen if:
  the producers were removed?
  the herbivores were removed?

Learner 4 - Competition

a. What is competition?

b. Why does it occur?

c. List some examples of both plants and animals where it occurs.

d. What are some of the advantages that result from competition.

Lesson 13

Teacher introduces the terms Biological Rhythms and Periodicity.

Learners are given the task of looking at various examples of daily, seasonal and lunar rhythms.

Learner 1 - Daily Rhythms

a. What causes daily rhythms?

b. Make a list of both plants and animals that are affected by daily rhythms.

Learner 2 - Seasonal Rhythms

a. What causes seasonal rhythms?

b. List some examples of seasonal rhythms.

Learner 3 - Lunar Rhythms

a. What causes lunar rhythms?

b. List some examples of lunar rhythms.

Learner 4 - Territoriality

a. What is meant by this term?

b. Why does this occur in nature?

c. How are animals equipped for this to work?

d. List some examples of this phenomenon.

Lesson 14

Teacher introduces the term symbiosis.

Learners look up and discuss the following symbiotic relationships: mutualism, commensalism and parasitism. We also distinguish between parasitism and predation.

Learner 1 - Mutualism

a. Describe this symbiotic relationship.

b. List a few different examples of this. Include examples of animals and plants, animals and animals, plants and plants.

Learner 2 - Commensalism

a. Describe this symbiotic relationship.

b. List examples of this type of relationship.

Learner 3 - Parasitism

a. Describe this symbiotic relationship.

b. List examples of this type of relationship.

Learner 4 - Parasitism and Predation

a. Distinguish between these two terms, use examples to support what you are saying.

Lessons 15 & 16

Nutrient Cycles

Teacher will introduce the lesson on nutrient cycles.

Learners themselves should be expected to come up with reasons for the importance of having a constant supply of nutrients.

Learners will be working in pairs in their group.

Learner 1 & Learner 2 - <u>Carbon Cycle</u>

a. List some of the uses of carbon.

b. What are the main sources of carbon?

c. Glucose is synthesized during photosynthesis:
List different ways in which carbon is released from the glucose.

d. What do you think would happen if carbon was not used up during the process of photosynthesis?

e. What factors are leading to an increased amount of Carbon-dioxide in the

atmosphere?

Learner 3 & Learner 4 - Nitrogen Cycle

a. What are some of the uses of nitrogen?

b. What is the main source of nitrogen?

c. List various ways in which nitrogen reaches the soil.

d. In which form do plants take up the nitrogen?

e. What are the roles of nitrifying and denitrifying bacteria?

Lesson 17

Terrestrial and Aquatic ecosystems

The Biosphere

Learners will again work in pairs in their groups on the above two topics:

Teacher can briefly introduce the lesson.

Learner 1 & Learner 3 - Terrestrial and Aquatic ecosystems

a. Compile a list of the various similarities between terrestrial and aquatic ecosystems.

b. Briefly show how terrestrial and aquatic ecosystems differ.
(main features of each way in which they differ)

Learner 2 & Learner 4 - Biosphere

a. What is the biosphere?

b. Give a brief overview of the different components of the biosphere. Pay special attention to how it affects plant and animal life.

Lesson 18

In this lesson, the teacher will inform the learners of a project.

Learners should work in groups. Different groups will select from the following topics:

1. Air pollution
2. Water pollution
3. Land pollution
4. Nature conservation

The idea is that the groups will present their project to the rest of the class so that information will be exchanged in this way. Learners will then at least know one of these areas in greater detail. This section will also be tested in the exam.

Learners will be given guidance with regard to the requirements of the project

In general, the lesson plans that Shireez and I had presented were well received and accepted without any major changes. The team was quite eager at this stage to get going with the implementation of these lessons. We were all feeling good in that our work was in essence prepared for the rest of the term with regard to our Grade 10 Biology. It was even stated that "It would be great to have all our work ready in this way". We had spent close on three hours going through the various lesson units. Everyone was feeling confident about what we were doing. A further fact that pleased the group was that Shireez and I had also prepared two tests and an assignment for our learners based on this chapter. We included this for each of the team. We also supplied copies of notes or diagrams to any school whose textbook lacked that information.

I also included a note for each teacher as a reminder about data collection. I also mentioned to the team that it could be likely that we would experience problems or

difficulties that are unforseen at this stage. This would be normal when involved with a developmental process. We should all remember that we are trying something new in our classes. I urged them not to panic or become too anxious, but to note these problems in detail as part of the data. We would address any such problems within the action research framework that we are using.

We agreed to meet at the end of March for a review of this our first cycle. I would at a later stage confirm the date for our meeting. I reminded the team that they could contact me at any point if they so wished. We wished each other well and concluded our workshop at 13h30.

3.5 STAGE 2: DOING THE RESEARCH

This stage was implemented during the 1996 academic school year. It involved the actual research taking place in at least one of each of the classes of our collaborative team. In the Eastern Cape, our academic year is divided into four terms. This division provided a convenient guide to begin and end a cycle. Elliot (1991:85) also points out that in the United Kingdom school terms are usually interspersed by fairly long vacations and suggests that this is at least a natural organizational unit of time in which to complete a 'cycle' of classroom action-research activity. Grundy and Kemmis (1984) state that in action research, a single loop of planning, acting, observing and reflecting can be regarded only as a beginning. Our investigation consisted of four cycles over one academic school year. The possibility of having more cycles would pose too many logistical problems: Generally class groups do not remain the same from year to year as some learners fail their examinations and others may even opt to change subject. Teachers are also allocated different workloads each year. I also thought that it would be too much of an imposition to ask teachers to be part of a research project that would run over more than one academic school year. This is understandable when considering that teachers are carrying heavy workloads and are still prepared o take on extra work in the form of this research investigation. During this stage, learning materials would be prepared by members of the team

and distributed so that the entire team would be using the same materials as a basis for their lesson presentation to their classes using the cooperative learning format. Data was collected using our agreed upon techniques. The team met formally after each cycle which was generally at the end of each school term. After each cycle, we would use the data recorded and presented by each member stating what worked well and what was cause for concern. A list of all these problem areas was generated after which discussion would take place. The aim of this discussion was to offer alternatives to over these problems faced by any member/s of the team. This would then lead to a modification of the plan of action for the next cycle. This followed the action research moments of planning, acting, observing and reflecting. Besides the formal meetings, I would from time to time make personal or telephonic contact with team members with regard to how we were progressing.

Data was also collected by means of a questionnaire that was administered to a sample of learners at the end of the school year. Some of these learners also responded to a group interview where they shared their experiences of the year with regard to the cooperative lesson structure.

3.6 STAGE 3: DESCRIPTION OF DATA

The final stage was to be implemented from 1997, that is, directly after the collection of data in stage 2. Due to various factors relating directly to my work as teacher and later as principal, I was not able to begin with the analysing and describing of data as early as I had hoped.

This phase is characterised by the description of the data. Ely (1991:167) states that the written presentation is of crucial importance: in a deep sense, what one writes *is* what happened and what was learned. The presentation is what exists about the research.

During the implementation stage (stage 2), several meetings of the research team

were held where a preliminary analysis of data took place on an ongoing basis. This was done largely within the action research spiral where we would reflect on a cycle. Schensul and Schensul (1991) state that the participation in analysis of data contributes to its interpretation because participants are familiar with the research. Ely (1991) is of the view that qualitative research involves almost continuous and certainly progressive data analysis from the beginning of data collection.

The final analysis of data will be done by myself. Part of the reason is that I have been both facilitator and co-researcher in the project. I will thus report on the research as conducted by us as a collaborative team as well reflect on of the functioning of the team during this project. The final analysis takes place when the researcher has left the field and sits alone. Many researchers appreciate the input of experts who have 'been there many times before' in helping to get started (Ely, 1991). Patton (1990), however, states that there are absolutely no rules except to do the very best with your full intellect to fairly represent the data and communicate what the data reveals given the purpose of the study.

3.7 VALIDITY IN ACTION RESEARCH

One of the problems associated with all kinds of research is that of validity. A common challenge to action research is that it is subjective and therefore unreliable, that is, the solutions that it claims to generate cannot be universally tested and are therefore invalid (McNiff, 1992). Lomax (1986) in McNiff (1992:131) points out that:

> As action researchers we do not claim to find the final answer to a question, but we do claim to improve (and change) educational practice through the educational development of practitioners. ... The validity of what we claim would seem to be the degree to which it was useful (relevant) in guiding practice for particular teachers and its power to inform and precipitate debate about improving practice in the wider professional community.

Winter (1987) sees validity in action research not as a matter of being 'correct' or a correspondence between two simple entities, but of adequately representing the 'conditions for its possibility', which, he argues, are found in the principles of reflexivity and dialectics.

Ely (1991) speaks of trustworthiness. A qualitative researcher should pay continuous, recursive, and excruciating attention to being trustworthy. This concern begins before the first word is written and does not end until the research is completed. The quest is to make the research project credible, produce results that can be trusted, and establish findings that are worth paying attention to.

In action research we accumulate histories - of our own deliberate and systematic enquiries and of the action research *histories* of others. We are not looking for generalizations or testable hypotheses, but *wisdom* which will inform our strategic action. In short, the fruits of enquiry for action research are of two general types:

- *systematic developed practices:* for the action researcher, new ways of working which constitute an emancipation from the constraints of habit, tradition and institutional intransigence; and
- *case studies of change and development through critique:* for others, interpretive products, a body of knowledge about what is necessary and what it means to bring about changes in social life (Brown, Henry, Henry & McTaggart, 1982)

In my attempt to validate this research, I took note of what various researchers (Cohen and Manion, 1994; Ely, 1991; Elliot, 1991) had to say on this issue and applied the following:

- I made use of dialogue with colleagues, friends, co-researchers and learners within the research project.
- I would write the text in a way which would adequately represent the 'conditions for its possibility'.

- I would write the text in such a way that the symbolic description is true about the situation it describes.

3.8 WRITING UP THE RESEARCH

The job here is to create a text in which the person or persons we have learned about come to life in a way that is true to their meanings. The written presentation is of crucial importance as what one writes *is* what happened and what was learned. The presentation, not what is held privately in the head and heart of the researcher, is what exists about the research (Ely, 1991).

In determining the voice that I would use to create this narrative, I reminded myself of how reluctant we practising teachers have become to accept the results of researchers or academics whom we claim are often removed and out of touch with the realities of our classrooms. I therefore consciously decided to write, not as an academic in training, but as a teacher wanting to share the experiences gained in this research. The writing is therefore, in my view, written in a simple style, reflecting on the experiences as they unfolded to us. My writing in the first person is also deliberate as this is our story as experienced by us. We were fully involved in this investigation and we are a part of what had transpired in our classes during this research.

This action research initiative was undertaken to improve our own practice as teachers. We do however believe that the insights gained in this research will have practical use for our colleagues in the teaching profession. I trust that they will find the style of writing easy to follow and accept it as a work that has been undertaken by ordinary practicing teachers.

CHAPTER 4
DESCRIPTION OF THE ACTION CYCLES

> ***In school improvement research, it is also generally recognised that schools need to become learning organizations, and if this is to be achieved then teachers as well as pupils have to become learners. Since change in part stems from the thoughts and actions of teachers, the professional development of teachers is a crucial aspect of the process of school improvement***
> ***(John Quicke, 1999:58).***

4.1 CYCLE 1

The planning stage for the first action research cycle had taken place in the last school term of 1995. Various aspects had been planned, debated and negotiated within the research team as discussed in chapter 3. The following paragraphs depict a summary of this planning phase.

The first chapter to be taught to our Grade 10 learners using the cooperative method was broken down into lesson units. Each lesson was further broken down into questions suitable for a four-member learner group. Each learner in the class was placed into these four-member groups by the teacher. The questions of each lesson unit was then assigned to the learners in each of the groups.

The learners were then given a set time to read/scan the complete lesson unit in the textbook. In this way they could see where and how their specific parts/questions fit into the complete lesson unit. Hereafter the learners were to begin learning their specific section/s of the lesson. The aim was for them to know and understand as far as possible their piece of the 'jigsaw'. After a certain amount of time had elapsed, and when the teacher noted that learners were completed with this phase, the learners were allowed to get together in their

'expert groups'. Depending upon the number of ordinary groups in the class, there could have been two or three of these expert group teams. In a class of 40 learners, ten learners would have had the same piece of the jigsaw to learn. They would be divided into two expert groups. The teacher too, would have indicated in advance which learners would be forming a particular expert grouping. These classroom arrangements were under the direct control of the teacher who generally took note of the complete picture, that is, learners absent, etc. The teacher would reshuffle or regroup if necessary in order to have both a balance in class as well as fully functioning groups.

The meeting in expert groups served to ensure that the members in that expert group had correctly interpreted and learned the work assigned to them. They would take turns to share their answers/views with each other with regard to their particular questions. They were expected to discuss any differing views and where necessary they would have to consult their textbooks to verify their responses. The textbook was expected to have all the relevant information that was needed by the learner. Where such information was not in the textbook, additional notes would have been supplied by the teacher from other books. If after a time learners had not managed to agree on a particular answer/reason, they could call on the teacher for help. The teacher's help would consist of pointing the learners in a direction to solve the problem for themselves. It was extremely important for the learners in the expert groups to have correct information as they would be teaching this to the rest of the learners in their original groups. We wanted to prevent the transference of incorrect information to other learners.

The teacher's role in the class would be to circulate between the groups in a manner that did not threaten, disrupt or intimidate the learners. The teacher was at all times still in charge of the class, and was to ensure that conditions prevailed that allowed for the groups to function properly. The teacher was not expected to be the source for answers to struggling learners or when learners were wrong in discussions. The teacher had to act as a guide in such instances and with the use

of a comment and/or question point the learners in the right direction to discover the relevant information for themselves.

After the learners had completed mastering the work in their expert groups, and when the teacher was satisfied that all groups had completed, the learners were allowed to return to their original groups. Each learner now took turns in the order of the list of questions assigned to share/teach their part of the jigsaw to the rest of their team. We thought that it was important to keep to a particular order as learners often argue about who should go first, etc. Learners in the group were allowed to question, seek clarification or make comments to the expert in trying to understand that which was being shared with them. It was the expert member's duty to ensure that the other members in the group understand that which was being taught to them. This emphasizes the feature in cooperative learning that 'members are responsible for their own and the group's learning'.

The teacher had appointed for a period or particular time-frame a learner to take charge of the group's functioning. This learner would ensure that all members were given a turn to speak or ask questions, and that debate or discussion was held in an orderly way so as not to disrupt the rest of the class. Learners were to make notes in their workbooks with regard to that which was being discussed and shared by the expert member.

The key features within cooperative learning as accepted by our research team would need to be seen as taking place in our classrooms in this action phase. It was expected of us teachers to ensure that they did occur. These features, again, are:

- positive interdependence amongst learners
- that every learner contributes
- that the learner work constructively, helping each other
- individual accountability and person responsibility

The first action phase of our research using a cooperative learning method to teach Biology took place at our three schools in the period between mid February 1996 to the closing of school at the end of first term in March. During this time, we the teacher researchers would implement the research and observe our classes, recording as much detail as our limited time would allow. All aspects, both positive and negative or problematic and successful would be recorded. These recordings would form the basis for discussion during our reflective meetings at the end of the action cycle. Our discussions would therefore largely focus on the following:

- positive aspects of the cycle
- problems experienced during the cycle
- discussion on problems experienced during the cycle
- suggested solutions / changes or revised plan for the succeeding cycle

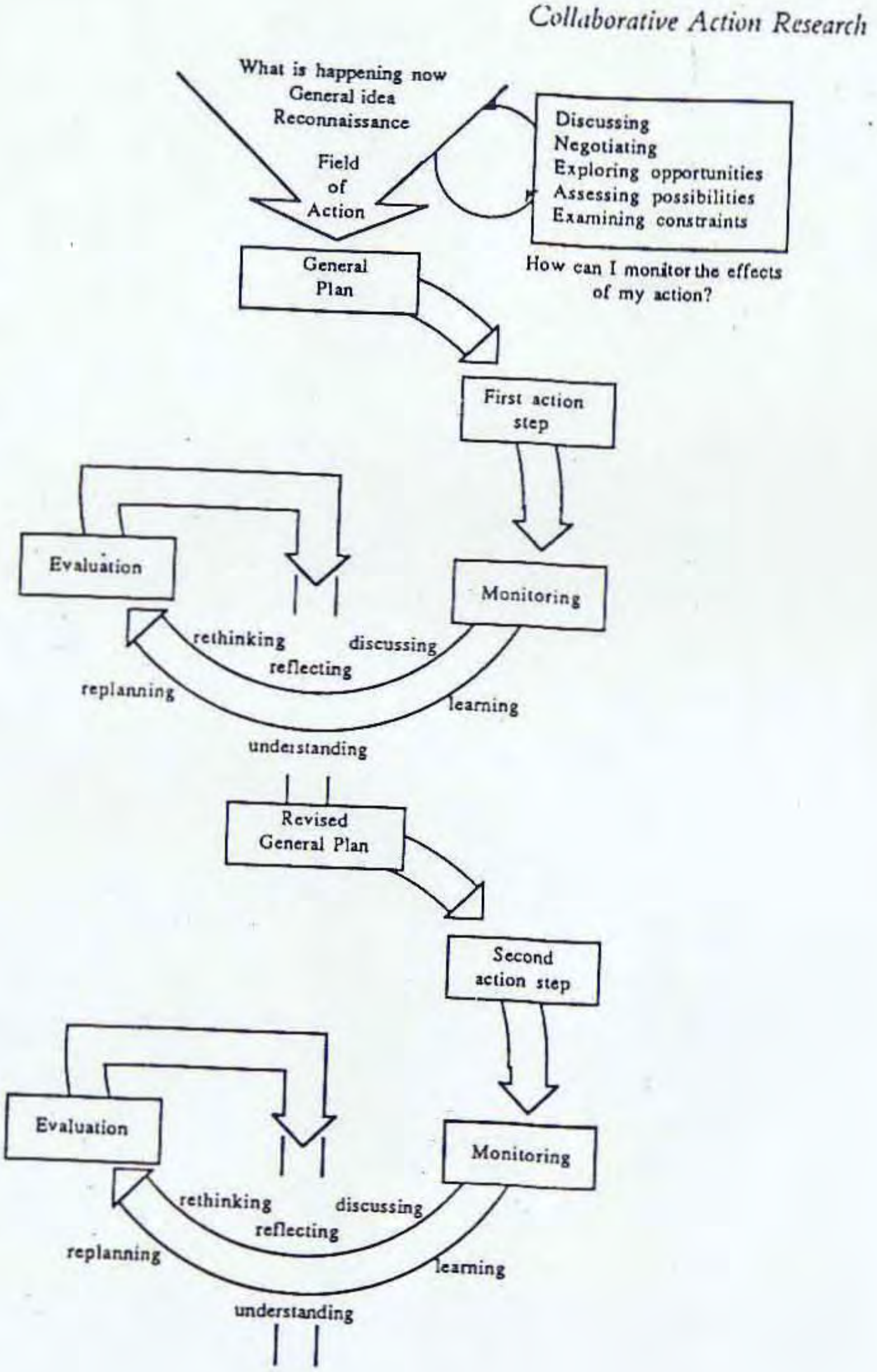
I think that all of us in the research team were quite clear that the reflective session would provide an opportunity to identify strengths and weaknesses within the cycle. This would then be used to modify our plan with the aim of forming a revised plan for re-implementation in the following action cycle. Our plan of action would follow the steps within the action research spiral. The following diagram (overleaf) recaps that given on page 58, adding some important details:

Figure 2: The action research spiral

Source: Ebbutt, D. (1985). Educational action research.

Figure 2: The action research spiral

Source: Ebbutt, D. (1985). Educational action research.



4.2 FIRST REFLECTIVE SESSION: [MEETING 6]

Our first reflective session was schedule for the 25 March 1996. Although I had been in contact with team members telephonically and with personal visits to their schools, I was still very anxious to hear how the first cycle had played itself out at our different schools.

Our agenda (see appendix 8) for this meeting called on the teachers to reflect on their experiences in the following ways:

- general comments on the process to date
- identification of problem areas
- identification of possible solutions for implementation
- identification of positive aspects
- preparation for the next cooperative chapter

I welcomed all the members of the research team to this meeting. I asked all to fully participate in the meeting. We needed as much feedback as possible in order for us to determine our progress thus far as well as for us to bring about any changes for the following cycle. As we had committed ourselves to four cycles, it would certainly be unwise to repeat any of the problems that we may have experienced in this first cycle. Patricia tendered an apology as she had a staff meeting and lecture scheduled for this day as well.

I asked members to start by giving us a general overall comment about how the process was going at their schools. Their responses were as follows:

- Helen - going well with a few minor problems
- Shireez - generally well, but also with minor problems
- Cindy - experienced major problems and stopped with cooperative lessons
- Sivan - going well, but not problem free

4.2.1 Positive Aspects of the First Cycle

We decided to look at some of the positive aspects that we had experienced in our first cycle before discussing our problems in greater length. These positive aspects provided by all members are listed together and not under individual teachers or schools.

- Most learners are trying and are enjoying this approach.
- Learners are realising that they know things, that they are capable of finding answers without the teacher's help.
- Learners' self-esteem seems to be growing.
- Learners are now forced to be active participants in their work.
- Group mates were rejecting laziness by learners.
- Learners themselves were complaining about learner absenteeism.
- Learners were asking more questions than usual in class.
- Learners said that they preferred asking each other for help rather than asking the teacher.
- The weaker learners preferred asking peers for support.
- Some learners indicated that:
  - ✓ at least I'm doing some work
  - ✓ I don't get bored in class anymore.
  - ✓ at least I know the piece I did.
- Group members were calling each other to account if they shirked their responsibilities.
- The weaker learners seemed to be doing better and were enjoying this approach.
- We, the research team, with the exception of Cindy were positive and happy about the approach thus far. Our general feeling was that our problems could be taken care of.

4.2.2 Problems Experienced During the First Cycle

We then moved on to the problems experienced by each of the teachers over our first cycle. Each of the teachers were given a turn to present their problems experienced to the group. We would at end of these presentations begin a discussion of these problems.

Helen:

- I was very impressed with my grade 10F group. They were able to express themselves very well. I was expecting 10A to fair better. Grade 10A seemed to be limiting themselves to what was in the textbook only. My other classes in general were all trying hard.
- I found that my learners were wanting to communicate in Xhosa. This is something I as a rule discourage in my Biology class.
- I did have a problem with time. Cooperative lessons take more time than traditional lessons. I am concerned about completing enough work.

Cindy:

- My first few lessons using cooperative learning went okay, but thereafter I had quite a few problems.
- My classes are very large
- Springdale has a different type of child, the learners don't know how to behave. They come from the lower grades this way.
- Learners leave their books at home.
- There is a high absentee rate.
- The noise level is too high.
- Learners were too excited, they're full of energy.
- Learners just don't know how to tone down.
- Learners will first need to work on their behaviour. They are the same in other classes as well.
- Personally, I cannot take the noise. I don't want to disturb other classes next door or upstairs.

- Learners are telling me that I am supposed to do the work.
- I stopped with the cooperative work and don't know where I am going from here.
- It seems as if we are powerless, we can do nothing.
- The learners must just decide if they want to work.
- In the traditional method, I can tell the learners to sit down, keep quiet and start working. They are better behaved in this way of teaching.

Shireez:

- I had a few problem learners in one class. I removed them from their groups and informed their class teacher about their behaviour. They had to pull themselves straight before I allowed them in my class again.
- Learners are showing common mistakes in some answers. This showed that incorrect information was being shared.
- We teachers should not limit ourselves to the introduction, and rotation in the class only. We must summarize at the end of a unit.
- I experienced behavioural problems with learners as well as noise problems, but I was able to bring it under control quite easily.
- Time is a factor too. Cooperative lessons takes much more time than normal teaching does.

Sivan:

- One of my main problems was that I was in charge of three Grade 10 classes for all disciplinary problems. Teachers sent all their complaints to me to deal with. I lost some of my teaching time. Also, once I did this, I found that I was no longer able to be as relaxed with my class, as I would have liked to be. This often put me in the wrong frame of mind.
- In general, my learners were not unruly. There was some misbehaviour on a small scale.
- Many learners do have serious socio-economic problems.
- Absenteeism was a problem.

- Initially I had a shortage of textbooks, but it was sorted out.
- I felt quite exhausted by the end of the period. I was kept busy the whole period by circulating and guiding learners.
- I was not able to listen to all learner responses, and did not know where mistakes were creeping in.
- Many learners wanted my attention, often just for reassurance that they were on the right track.
- Cooperative work utilized more time per lesson unit which could be a problem.
- The noise level was a problem, but it is now at an acceptable level.
- In general, I am enjoying the work/process. My learners see that I am fully involved, not relaxing and leaving them to do all the work.
- Some learners do not like this approach. They feel that they're working too hard and that there's too much pressure on them.

4.2.3 Discussion on Problems Identified

As a team, we tried to identify and focus on the problems that were highlighted during this first reflective session. I reminded the team that it would be our aim to seek solutions to these problems so that our second cycle could be implemented taking into account these suggestions offered. It was hoped that our revised plan of action would successfully address these problems. We identified the following as the main aspects needing attention:

- noise level in class
- misbehaviour
- learners leaving textbooks at home
- absenteeism of learners
- sharing of incorrect answers at times
- too much time spent on a lesson unit

As a team, we now started discussing possible solutions to our identified problem areas, and these are listed below.

4.2.3.1 Excessive Noise by Learners

- Learners often did not realize that they were being too loud. Some of them were over-enthusiastic. In addressing this problem we had to be careful of not letting the learner lose interest in wanting to communicate/participate in discussion, as this was an important part of cooperative learning.
- We would have to alert the learners to this problem, constantly. If the noise level in the class is too high, then the teacher needs to ask the entire class to stop working for a moment so that they could be alerted to the problematic situation. We would also speak to our classes about being considerate to other groups in the class as well as neighbouring classes.
- Learners need to hear and see what we are complaining about. When a particular group is being too loud, it needs to be pointed out to them. Similarly, an appropriate noise level also needs to be pointed out.
- As teachers we should be patient, and constantly remind learners as to what is acceptable. We agreed and accepted that this would probably be a process in itself.
- A tape-recorder should be used where a group just could not seem to understand the problem/complaint. This may highlight it to them.
- A teacher constantly circulating in class should pick up on most of the problems. The teacher's presence may reduce the noise level in a group.
- Learners not staying on task was possibly a contributing factor. We teachers would need to pick up on this quickly.
- Group members must call each other to account when a member is not fully cooperating.
- The group leader for the lesson must also be empowered to control the noise level in his/her group.
- We teachers would need again to remind other staff members, especially those in close proximity to our classes, about what we were doing. Other staff members should feel free to let us know if our noise level interferes with their work.

4.2.3.2 Misbehaviour

- We agreed that this was a problem that we as teachers were faced with on a daily basis in our classes, irrespective of what teaching method we were using.
- We however felt that the less formal setting of the classroom, the new spatial arrangement where the learner's backs sometimes faced us, tended to aggravate any misbehaviour.
- The teacher's not having full facial contact with the entire class at the same time, probably brought out the worst in some learners.
- While some teachers saw this as a sign of the times, we agreed that this was unacceptable and that we would take charge of our responsibilities.
- Again, we needed to participate fully in our classrooms.
- We would circulate in our classes without our movements becoming predictable to the learners. We should vary our patterns of movement, that is, not follow a set sequence between groups.
- We would strive to win learners over. We needed to get the group to function as a team and not as separate individuals. Team rewards would be encouraged.
- Learners needed to be reminded that this teaching method did require more maturity /responsibility of them.
- In severe cases, we needed to follow our school's policy or guideline with regard to misconduct to address these problems.
- Parental contact and help from other staff members should be sought where necessary.

4.2.3.3 Absenteeism

- This generally annoyed other group members who suffered because a certain member was compulsively absent. This generally resulted in an unfair distribution of work.

- To overcome this, we felt that the learner should be spoken to, to show him/her that they too could make a contribution to the group. The group in fact needed them to be fully participating. In this way their contribution would be valued by others.
- If this approach did not work, then, again, we needed to follow the school's policy and procedures regarding this matter.
- Habitual absentees should as a last resort be grouped together. In this way They would not benefit from the hard work of active members. This should be a short term solution.

4.2.3.4 Leaving Textbooks at Home

- We agreed that learners who habitually left their books at home should also be grouped together so that they would realise that they were unable to work or make progress without their books.
- As punishment, they would then have to complete their work outside the normal school hours.

4.2.3.5 Sharing Incorrect Information

- In contrast to what had earlier been said by Shireez, we agreed that our role as teacher in the class was definitely not limited to introducing lessons only. We had to be actively involved for the entire duration of the lesson.
- We teachers need to be in on what was happening with the groups.
- Where we pick up mistakes or misconceptions, we should guide the learner to the right answers. This must be done by posing other leading questions to the group so that they could solve the question for themselves. Learners should not be put in a position where they lost confidence in heir own ability. Cooperative learning requires that learners take charge, and not wait for handouts from the teacher.
- We agreed that as a way to possibly remedy this problem, we would change our format by asking each learner in the group to work out the full range of

questions in a lesson unit as opposed to only one part of the jigsaw. The learner would still only be responsible for coaching one part of the jigsaw to the rest of the group. The idea was that there would be greater consensus with the material and thus smaller chance for teaching incorrect information.

- Learners would still take turns discussing their answers. Group success as opposed to individual success was still crucial. Each member still needed to take charge of his own and the group's learning.
- It was also agreed that we teachers would do a general summing up at the end of a lesson unit, to ensure that all learners had acceptable answers.
- If time becomes a problem, model answers as prepared by us teachers could be pinned up or handed out to learners. This is only after the learners have exhausted their own initiatives in discussion sessions.

4.2.3.6 Time Factor for Cooperative Lessons

- We agreed that cooperative learning took far more time than traditional lessons.
- We acknowledged that we had a syllabus to complete and that we did not have indefinite amounts of time available to us.
- In a way we felt that the learners were doing the work more thoroughly than when they were simply passive receivers of information, typical of the traditional method.
- While we did not necessarily want to sacrifice possible quality for quantity, we felt that we had to find a solution to the time problem.
- We eventually agreed on the following changes to our original approach:
  We would do away with the meeting and discussion in expert groups as we already agreed that the whole group would work out all the questions. This would in itself save quite a bit of time. A particular learner in a group would still be given a specific piece of the jigsaw to teach to the rest of the group.
- Further, we would issue the learners the questions of the lesson units in advance. The learners would be asked to work out the particular unit as

homework. This would then also save time in the class and learners could then have more time to learn and teach the material in the class.

- We felt that interaction was necessary and learners had to be given time to communicate with each other. Although we would need to set time-frames for lesson units, we would have to be flexible as we cannot expect the learners to work at the same pace as an experienced teacher.
- We also thought that with experience over time, the learners would possibly work a bit faster.

4.2.3.7 Other Concerns:

- We also discussed Helen's concern about her learners wanting to discuss or explain the work in their mother tongue, that is, Xhosa. She did not normally allow this in her classes. It was suggested to her that the language medium for discussion was not a problem as far as cooperative learning was concerned. The rest of us were of the opinion that the usage of the mother tongue may in fact facilitate explaining. We agreed that anyone would prefer discussion in the language that they were most familiar with. Further, in contrast to the rest of us teachers, Helen could communicate in Xhosa and in this way she would be able to know exactly what was transpiring at all times. We therefore suggested to her that she allow the usage of Xhosa, unless it was a problem for any member/s of the group.

- My problem about losing teaching time through having to deal with other teacher's disciplinary matters would be dealt with by giving these teachers specific times when I would be available to handle such matters. I would also explain to these teachers how it affects my work and appeal for their understanding and cooperation.
- The problem with not being able to listen to all groups, and thus not knowing fully what is transpiring at all times is not easy to solve as we would never be able to be at all the groups simultaneously. We would have to accept

not being in full control as with the traditional teaching method. We would need to trust our learners. We had however decided on certain built in mechanisms with the revised approach to ensure that active participation took place and that correct information was carried over.

4.2.4 Main Changes in Revised Plan for Cycle Two

In summary, we agreed upon the following:

- Learners would be issued lesson units in advance and are to prepare answers for discussion as homework.
- Learners are to read/learn the complete lesson as opposed to only a part of the Jigsaw.
- Regrouping in expert groups would fall away.
- Teacher to provide a summary at the end of each lesson unit.
- The problems of excessive noise, misbehaviour, absenteeism and leaving of textbooks at home will be dealt with as follows:
  - ✓ teacher more vigilant, circulating in class, taking control over class functioning by ensuring that correct working conditions prevailed.
  - ✓ application of school code of conduct.

4.2.5 Concluding Comments

In general, the first action cycle seemed to have gone fairly well. Nearly all of us were satisfied with the progress made in the first term. We were still eager to continue with the cooperative learning approach. I was happy for this as I wanted us to be committed to completing all four cycles before we could ultimately finalize our decision about this teaching method.

Cindy had experienced many problems. I had made contact with her quite early in the term when she had indicated these problems to me. I had offered my advice to her, but it seemed that she was reluctant to accept it. In a way, I think she had

decided hat she did not want to continue. I urged her at this early stage to stay with the project and to use the cooperative approach only when she felt like using it. I also told her that her input in terms of her observations would be helpful with this research, even if the results were not favouring cooperative work. At this stage she agreed to stay on but as reported by her at this meeting, she had stopped with the cooperative approach. A close examination of her problems seems to point strongly in the direction of lack of control in the classroom. This is experienced by teachers, no mater what teaching methods they sometimes use. She also displayed a very strong desire to be in direct control over her classes. The cooperative approach does call for the teacher to 'let go' of the learners. We have to accept that she feels that her learners are not getting the best out of the situation, and she feels that the traditional method will best allow her to work in a way that is far less stressful to her. She stated that she did not need any extra pressure. Cindy was reluctant to accept the revised plan of action to deal with problems experienced over the first cycle. Clearly there were other factors at play. She did not want her subject head to check on her classes if they misbehaved or were too noisy, etc. Cindy also informed the group that she did have learners that were enjoying this cooperative approach, but that they were few. In her opinion most of her learners were not yet ready to work independently. At this meeting I again urged her to stay on as part of the team and to use the cooperative method, even if just for a bit between her traditionally taught lessons. She agreed.

I had also over the term checked on Patricia who was absent for this meeting. She was happy with the progress her learners were making. Her problems were similar to those experienced by us. I would at a later stage meet with her to get a more complete report and to brief her on the revised plan of action for term two. It would seem that many of the problems we experienced dealt largely with learner behaviour. All of us on the team were of the view that these learners were just as poorly behaved in other classes where teachers were using the traditional method. Our problem was that cooperative learning was calling for learners to be organized, responsible, accountable, and independent workers. The lack of discipline makes this approach more difficult. We also needed to take note that

this was a new approach to learning for the learners. To expect them to take charge overnight of their own learning was surely not easy on them. We teachers needed to accept that with time, improvements and a change of attitude by the learners was very possible. The team however felt that these problems were not so serious that they could not be overcome. We reaffirmed our commitment to taking charge of our classes and to persevere with our revised plan.

I was happy that the team was still together and for the positive aspects that were experienced, especially by the learners. Patricia was responsible for preparing the second term's lesson units. I would assist her and distribute these lesson plans together with a summary of our revised plan of action to all members of the team.

I thanked everyone for their continued participation and closed the meeting.

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4.3 CYCLE 2

4.3.1 Background and Preparation

Our second action cycle was implemented over the second term of 1996. The second cooperative chapter dealing with The Anatomy of Angiosperms was prepared by Patricia. These lesson units together with meeting minutes outlining our revised plan of action for the second action cycle were distributed to the team.

The following instructions and lesson units are those that were used during this our second action research cycle:

Note to teachers:

1. This chapter follows the one on plant tissues. It is assumed that plant tissue (structure and function) has been done thoroughly with learners.
2. The cooperative method will be different with this chapter and teachers need to implement this chapter taking our revised plan of action for cycle 2 into

account

3. It is suggested that we handle this chapter in the following way:
   - ✓ do the external structures of roots, stems and leaves before proceeding with their internal structures.
   - ✓ teacher and learner should make a collection of these plant organs in advance, so that a practical study could be undertaken here.
   - ✓ flowers should rather be done in the third quarter (spring)
   - ✓ where mono- and dicot plant organs are to be done, we will do the dicot in detail and simply show the differences with the monocot.
   - ✓ the entire chapter will be covered in approximately 16 periods.
   - ✓ tests and practicals will worked out for the chapter.

Unit 1

Roots - External Structure

A. Teacher and learners make a collection of various roots and root systems (tap and adventitious) in advance.

B. Teacher and learners germinate seeds in class (bean / mealie). This also well in advance of this lesson.

From the collections and information in the text books, the following questions should be worked out by each learner in the group:

1. Identify and distinguish between a taproot system and an adventitious root system.
2. List some functions of these two root systems.
3. Make simple drawings of these two root systems.
4. Observe the tip of a taproot. Make a diagram of it and use your textbook to help you identify the various regions of this taproot externally.
5. Give one function of each of these regions identified.
6. Teacher will prepare mounts of the germinating seeds, root-hairs, etc. could be observed by learners.
7. Make a labelled drawing of a root-hair.

Unit 2

STEMS - External structure

A. Teacher and learners make a collection of various stems in advance for a practical investigation. Collection should include those carrying: leaves, fruit, flowers, seeds, pods, buds.

1. List the various functions of stems from characteristics in the collection.
2. Identify a stem that is hard / woody from one that is soft / fleshy. Use your text book and distinguish between monocot and dicot stems.
3. Teacher will prepare a mount of an apical bud for observation under the microscope.
4. What do you think is happening in the buds that are found on stems?

Unit 3

LEAVES - External Structure

A. Teacher and learners make a collection of various leaves in advance for practical investigation.

1. Make a drawing/s of some leaves. Use your textbook to identify the various parts of a leaf.
2. Identify the different shapes/forms of leaves.
3. Observe the vein structure of leaves. Identify leaves that are monocots and those that are dicots. How do they differ from each other.
4. Why are leaves so important to our survival. List other functions as well.

<u>Note</u>

1. The following three units deal with internal structures of roots, stems and leaves.
2. Teacher should use microscopes and transparencies where available to assist learner comprehension of materials.
3. The link between structure and function of cells and tissues should be emphasized at all times.

4. Where applicable, the dicot will be done in detail and differences with regard to the monocot will be investigated

Unit 4

Dicotyledonous Root - Internal Structure

Study the diagram of the internal structure of a dicot root and answer the following questions:

1. Use your textbook and supply suitable labels for the drawing.
2. Name the three regions into which the internal structure of the root may be divided.
3. a. What are the main functions of the epidermis?
   b. What characteristics of the epidermis makes it possible to perform these functions.
4. a. List characteristics of parenchyma cells and name the function to which each is adapted.
5. What role does the endodermis play?
6. a. List the various cells and tissues that form the central cylinder.
   b. Name one function of each of these cell/tissues.
   c. How are xylem and phloem adapted to perform their functions?

Unit 5

Dicotyledonous Stem - Internal Structure

Study the drawing of the internal structure of a dicot stem and answer the following questions:

1. Supply suitable labels for the diagram.
2. How does the epidermis of the stem differ from that of the root?
3. The cortex consists of various layers: Name these layers.
4. List functions of the cortex layers and show how each is structured to perform its function.
5. Describe the role of vascular tissue in functions of the stem.

6. What tissue is found in the vascular bundle to make secondary thickening take place?
7. What is secondary thickening?
8. Briefly describe how this process takes place in stems.
9. list differences between dicot and monocot stems.

Unit 6

Dorsiventral leaf - Internal Structure

Study the drawing of the leaf and answer the following questions:

1. Supply suitable labels for the diagram.
2. Why do you think the epidermis of the root does not have a cuticle, while one is found in the leaf?
3. Name ways in which the epidermis of the leaf is structured to play a role in photosynthesis.
4. The mesophyll is important for photosynthesis, how is it adapted for this role.
5. Make a labelled drawing of the surface view of a stoma.
6. List functions of the stoma.

I remained in contact with the team members over the term to offer my support where it was needed. Cindy, I think had made up her mind to quit from the research team. I had tried to persuade her to remain on the team. On 26 April 1996, she dropped off a letter with me indicating formally, that she wished to resign from the research team. She gave as her reason that she would not be at school over the third term. I reluctantly had to accept the loss of her to our team. I drafted a letter where I thanked her for her participation and valuable input during this project.

4.3.2 Second Reflective Session [Meeting 7]

Our team met on 25 June 1996 at 18h00 for our second reflective session. Our meeting was scheduled for an evening due to various other commitments of team members. This again outlined the enormous amount of duties that team members

had to perform. I was therefore extremely grateful to those members who were willing to continue with this research project.

I welcomed all present. I once again encouraged all to participate fully, and to give feedback as honest and accurate as possible with regard to our second action cycle that had just been completed. I also recapped the spiral structure within action research to indicate where exactly we were in our research process. I asked members to especially focus on the changes we had implemented over the second cycle. See appendix 9 for the agenda.

Shireez had tendered an apology as she had come down with the flu. I had issued her with a copy of the agenda and asked her to jot down her comments so that her input could be incorporated with our discussions. She had complied with this request.

4.3.3 Brief General Comments on Second Cycle

All of us reported that the cooperative lessons had gone much better during the second cycle. We identified the following reasons for this improvement:

- learners were getting used to the cooperative learning method.
- learners were beginning to realize that the cooperative approach required their active participation.
- the nature of the work in the second cycle was much easier for the learners than that of the first cycle.

4.3.4 Positive Aspects of the Revised Action Cycle

- Learners were more involved with the lesson in their groups. This we felt was largely due to the fact that learners had to work out *all* the questions in a lesson unit. The difference here was that in the previous cycle, one learner would be doing nearly all the talking on a particular point/question.

Because all the learners were now familiar with the question, better discussion followed. This discussion tended to reinforce what the learner had done on his/her own.

- The sharing of incorrect information seemed to be eliminated due to this same fact, that learners had worked out all the questions for themselves. Immediately, if a learner's answer/response differed, it was discussed and checked out. In the first cycle, the group relied heavily on one learner's (expert) input with regard to a particular question. Here learners were provided with a kind of immediate feedback, in terms of their responses.
- Learners were able to follow the lesson more easily during this cycle.
- All of us reported that the learners seemed to be listening more attentively to other members in their group. This we suggested was because learners were waiting for an opportunity to add information, if it was left out by another group member (indicating the competitive nature that had become part of the learner).
- Nearly all learners had taken time to work out the questions at home. This greatly helped, as much more time was now being spent on actual discussion and coaching. This differed from the previous cycle where learners were trying to hastily jot down what was being reported/discussed by a particular member of the group. The quality of group participation was therefore in our view greatly improved.
- It seemed that learner self-esteem also improved. This we attributed to learners being able to be active participants in the group. This was made possible largely due to their having worked out all the questions of the lesson unit. They were thus more familiar with the work under discussion. A feature that impressed us was that some of the learners began working out units in advance. In the past, learners would rush through their work so that they could chat to each other. Now they spent time working ahead. Perhaps because they were engaged in so much discussion during lessons, there was no need for further idle chat.
- The summary at the end of a lesson unit as provided by the teacher also helped to reassure learners. Sometimes learners did not trust their own or

other member's information. That way of thinking, that teacher knows best, was still part of the learner's way of thinking. We noted that even if learners had the correct responses, they still waned this to be confirmed by the teacher.

4.3.5 Problem Areas Encountered in Cycle 2

This action cycle in general had gone very smoothly. We experienced many positive things in our classes during this cycle. The problems reported by the team in this reflective session were few. If I had not been a researcher as well as facilitator, I may have been inclined to think that the team was beginning to tire and therefore did not want to heavily debate problem issues. The fact that my experiences were very similar to the rest of the team's made their views so much more easy to accept.

- We noted that certain chapters were rather long. This translated into our spending long periods using the cooperative method, and then long periods on the traditional method. Because the learner now had to prepare in advance for the cooperative lesson unit, the learner was busy with homework nearly every day for the entire chapter. This was then followed by a chapter of traditional lessons where learners had a long lay-off from doing homework. The long chapters also in a way tended to frustrate some learners as the cooperative method was fairly demanding on the them. Learners had to be active participants, and this often does not go down well with the lazy learner.

- We also noted that the *greater variation* in the work went down much better with the learners, as compared with long chapters dealing with the same issue. This second cycle's work provided variation, with a change in topic after just a few lessons.

- Patricia still complained about *time.* She stated that periods at her school

were always being shortened, or disrupted due to other activities. This was a problem as she sometimes did not complete a unit in the scheduled time. She found no time for revision, or to do practicals and tests properly. The problem of time was again due to cooperative lessons taking more time to complete than traditional lessons.

4.3.6 Team's Suggested Solutions

We discussed these problem areas and generated the following as solutions for implementation in cycle 3. We were in general very happy with the way cycle 2 had developed and were keen to stick with cycle 2's plan in general. We were however willing to incorporate solutions of these minor new problems, to form our revised plan for the third action cycle.

4.3.6.1 Long Chapters and Variation of Work

In the third term, our cycle would have consisted of one cooperative chapter and one traditional chapter. To deal with the problem of long stints of either approach, we decided that it would be best to split the work in each of the remaining chapters. This would now mean that part of a chapter would be taught using the cooperative method and part would be taught using the traditional method. This would also then deal with the aim of varying the type of work for the learner. No longer would the learner have to spend long periods on the same topic or chapter. This also seemed to us to be a more logical and natural way to teach.

4.3.6.2 Time Factor

Since we were all still intending to complete our prescribed syllabus, it was decided to scale down the amount of cooperative work to approximately 40% of the chapter. This would allow us teachers to progress a bit more quickly with completing the syllabus as we cover work more quickly when using the traditional method of teaching.

4.3.7 Main Points of Revised Plan for Cycle 3

- Largely the same as in action cycle 2, with the following minor revisions:
- Cooperative work spread over both chapters for the third term, or cycle 3.
- Cooperative work reduced to 40% of each chapter.

4.3.8 Report on Progress of June Examinations

For the June examinations, all the participating schools in this project wrote a common paper which I had drawn up. The other schools reported no problems with the paper. The learners were familiar with the style, as the question paper largely followed the style used for our lesson units. Teachers reported their examination results as being fairly similar to past years. We noted that the working out of questions for lesson units did seem to benefit learners for examination purposes.

Because this sharing had gone so well for the June examination, we decided that we would follow this pattern for the remaining examinations as well. We agreed to the following work distribution:
Helen - September Standard Grade
Sivan - September Higher Grade
Patricia - Final Standard Grade
Sivan - Final Higher Grade

We further agreed that Patricia and Helen would prepare the materials for the third cycle/term. I would assist by typing up this material for distribution to the team members.

4.3.9 Unavailability of Shireez for Cycle 3

I informed the members that Shireez would no longer be available for the third term. She was due to go on maternity leave and would be off from school for the rest of the year. Because both Shireez and I are from the same school, we would not be losing the participation of a school. Three schools would still therefore be involved with the research. Due to the fact that so much had already transpired during this research, I decided not to get Shireez's substitute involved with the research. Our team had already been together for nearly ten months. I would however be sharing information at my school with the new teacher.

I closed the meeting at 20h45 by thanking everyone for their contributions and valuable input. I gently reminded the members to continue with their observations and data collection. I would circulate the minutes indicating agreed upon decisions for our revised action plan for cycle 3 together with the prepared cooperative lesson units.

4.3.10 Concluding Comments

In general, I was happy with the progress our team was making. We had reached the halfway mark in terms of having completed two action cycles. I was greatly appreciative of the efforts put in by Patricia, Helen and Shireez over the last term. I was sorry that we would be losing Shireez from our team. Both Helen and Patricia were still dedicated to the research project. For this I was thankful. The larger class sizes this year was placing greater strain on all of us teachers. The research project was definitely an added responsibility for us all. I still often got the feeling that the other members still saw this as my 'research and not as our' research. Although I was prepared to carry most of the preparation work, I did want all to feel that they had an equal responsibility and stake in the research.

4.4 CYCLE 3

4.4.1 Background and Preparation

The third action cycle of our research took place over the third term of 1996. Both Helen and Patricia were responsible for preparing the materials for this action cycle. To a large extent, we would be following the same procedure as in the second action cycle. The minor modification in this revised plan of action for the third cycle would be to:

- alternate between the cooperative and traditional teaching methods.
- approximately 40% of each chapter for the term will be taught using the cooperative method.

LESSON UNITS IMPLEMENTED DURING THIRD ACTION CYCLE

During the planning of the materials, the entire chapters for the term were broken down into lesson units. Some of the lesson units were then selected to be taught using the cooperative learning method. The chapters for the third action cycle were broken down as follows:

Chapter: Mammalian Tissue

Unit	***Teaching Method***
1. Introduction to mammalian tissue squamous epithelium	- traditional method
2. Cubical epithelium columnar epithelium	- traditional method
3. Ciliated epithelium glandular epithelium	- traditional method
4. Areolar connective tissue dense connective tissue	**- cooperative method**
5. Cartilage	- **cooperative method**
6. Bone tissue	**- cooperative method**

7. Blood - plasma - traditional method
8. Blood - corpuscles , platelets - traditional method
9. Muscle tissue - traditional method
10. Nerve tissue **- cooperative method**

Chapter: Skeletal System

Unit ***Teaching Method***

1. Introduction - traditional method
   Different systems in human body
   Skeletal system divisions
   General functions of an endoskeleton
2. Skull **- cooperative method**
3. Vertebral column and thoracic cavity **- cooperative method**
4. Vertebral column and thoracic cavity **- cooperative method**
5. The appendicular skeleton - traditional method
   The upper limbs
6. The pelvic girdle and lower limbs **- cooperative method**
7. Joints and movement **- cooperative method**
8. Muscles and movement and levers - traditional method
9. Muscles and movement and levers - traditional method

Chapter: Mammalian Tissue

Unit 4

Areolar Connective Tissue

1. Where is this tissue found in the body?
2. Describe the structure of this tissue.
3. Make a labelled drawing of areolar tissue.
4. List functions of areolar tissue

Dense Connective Tissue

5. Describe the structure of dense connective tissue.

6. What functions are performed by each of the following?
   (A) ligaments and (b) tendons
7. Make a labelled drawing of this type of tissue.

Unit 5

Cartilage

1. Describe the ground substance of cartilage.
2. Name three different cartilage types.
3. Describe hyaline cartilage.
4. Where is hyaline cartilage found in the body?
5. List two functions of hyaline cartilage.
6. List two functions of white fibrocartilage.
7. List two functions of yellow elastic cartilage.
8. Make drawings of the different cartilage types to illustrate their differences.

Unit 6

Bone Tissue

1. Describe the ground substance of bone and name the salts of which it is composed.
2. What is the name of the canals that occur through the length of bone?
3. What is found inside these canals?
4. What occurs around the canals?
5. How are the lacunae connected with each other?
6. Name the membrane that surrounds the bone on the outside.
7. Make a labelled drawing to show the microscopic structure of bone.

Unit 10

Nerve Tissue

1. What are the cells of nervous system called?
2. Name the various parts of which a neuron is built.
3. Make a labelled drawing of a neuron.
4. What function is performed by: (a) dendrites and (b) the axon

5. List different neuron types.
6. What is a synapse?
7. Of what importance is a synapse?
8. Distinguish between sensory and motor neurons.

Chapter: The Skeletal System

Unit 2

Classification of bones and the skull

1. What criteria is used to divide bones into different classes?
2. Name the different classes of bones. Give a short description of each and say where it could be found in the body.
3. The skull can be divided into two sections. Name these sections.
4. What is the shape/form of the bones in the cranium?
5. How are the bones of the cranium attached to each other?
6. Where are the temporal bones situated? What organs do they accommodate?
7. At which bone is the foramen magnum situated? What role does it play?
8. Describe the shape/form of the facial bones.
9. Name the only facial bone that is moveable.
10. How many bones are there in total in the skull?

Units 3 & 4

Vertebral Column and Thoracic Cavity

1. The vertebral column is the central axis of the body. What is meant by this?
2. Five different vertebrae occur. Name them and give the number of each type.
3. Make a labelled drawing of a typical vertebrae.
4. Differentiate between true and false vertebrae.
5. What important role is played by the atlas and axis bones?
6. Which of the vertebrae is strongest?
7. Name the parts of the thoracic cavity.
8. Describe the build/form of a rib.
9. Differentiate between false ribs, true ribs and floating ribs. Give the number of each.

Unit 6

The Pelvic Girdle and Lower Limbs

1. Name the different parts of the pelvic girdle.
2. Describe the shape of a hip bone. Name the various parts (bones) of the hip bone.
3. Supply suitable labels for the diagram supplied.
4. Give a short description (1 or 2 sentences) of each of the bones in the lower limb.
5. Which is the longest and strongest bone in the body?
6. Make a labelled drawing of a typical longbone.

Unit 7

Joints and Movement

1. What is a joint?
2. How are joints classified?
3. Give a short description of each of the different classes of joints. Also give examples of where they are found in the body.
4. Make a labelled drawing of a typical moveable joint.
5. List different types of synovial joints and give an example or two.

4.4.2 Third Reflective Session [Meeting 8]

This meeting was held on 18 September 1996 at St. James Secondary School and started at 13h15.

I welcomed Patricia and Helen to the meeting. Our team was now reduced to 3 members from 3 different schools. We were thus all present. I thanked them for being present and encouraged them to again participate fully in the meeting. I recapped the procedure that we would follow within the action research methodology. This entailed reflecting on the cycle we had just completed, with the option of making further amendments. Our revised plan of action would be

implemented during cycle 4, scheduled for the fourth term. See appendix 10 for the agenda.

4.4.3 General Comments on the Cycle

To get started, we proceeded with general comments with regard to our experiences with the third action cycle. The following was reported:

Patricia:

- My learners prefer the current mixed approach, that is, a combination of traditional and cooperative lessons within the same chapter.
- I found that there was a better balance during this cycle.
- I still find it difficult as teacher to let go fully of my learners, therefore a balance within the lesson may also be necessary. The teacher input and cooperative discussion in groups brings about this balance.

Helen:

- This term was again quite different for me in comparison with the previous one.
- I found that the process went much better.
- My learners are getting used to the cooperative method.
- The mixed approach works well.
- Learners are better prepared and more serious about their work.
- The presence of a tape recorder in class helped to create a more serious mood.
- I did have more teaching aids available for this work.
- My learners really prepared and presented work well in their groups.
- Good discussion took place.

Sivan:

- My learners too preferred the mixed approach.
- This approach was less taxing on the learners, especially the lazy ones as they have to prepare mostly at home. They also have to be active participants.
- My learners are beginning to prefer working on their own in their groups (without me). Discussion takes place as the learners have noted that silence in a group draws my attention.

It does seem that all three of us felt that the third cycle had proceeded much better than the second. I also got the feeling that there was a more positive spirit in the team regarding the cooperative learning method. This was in contrast with the earlier periods of the research when members were not as yet sure or convinced that this method could work in their classes. Very few negative points or problems seem to be raised.

We then moved on to sharing with each other our positive experiences of this cycle.

4.4.4 Positive Aspects of Revised Action Cycle

Patricia:

- I find that I had more time in the cooperative method to get to know my learners better. My learners were happy with this and it also seemed to encourage them. There is far more learner- teacher interaction now as compared to the distance created in a traditional setup.
- My learners were so proud and excited to see the photographs of themselves working in groups. This together with the presence of the tape recorder, also further motivated them.
- There was greater participation in the groups, and this seemed to spill over during the traditional lesson too. I think their confidence just improved so much more.
- Most learners did their homework without a problem, with the exception of those learners who were a problem to all their teachers.

Helen:

- Learners try and do well when presenting to others in the group.
- They are beginning to express themselves very well.
- They are even using other books for information where possible.
- They are coming up with new ideas, often wanting to show-off to group mates.
- My lazy learners are also now getting involved. I selected a problem learner to take charge of her group, and this worked well for her. She clearly showed improvement.
- There is less absenteeism.
- Learners are enjoying sharing ideas.
- They are respecting each other's views and ideas in the group.

Sivan:

- My learners are still enjoying the cooperative lessons.
- There is good participation in the groups, learners are active in their groups.
- There is a greater independence shown by learners from the teacher.
- My weaker learners who are often embarrassed easily, are very active in their groups. A particular learner told me that she did not mind asking a group member to re-explain something even for a fourth or fifth time until she understood. She said that she would not ask the teacher more than once.
- The mixed approach was less demanding on the learners and they showed far less frustration.

It was encouraging to hear and report on the positive aspects in our classes. Clearly, it could be seen that learners were developing many skills and that these skills were also being used during the traditional lessons.

We then moved on to reporting on problems experienced during the third cycle:

4.4.5 Problems Experienced During the Cycle

Patricia:

- Time available is still my greatest problem. This is brought about by disruptions in the school day. Because I am uncertain if I will complete my work, I tend to be less relaxed with the cooperative lessons at times.
- I don't have enough time for revision and testing.

Helen:

- I had problems with the tape-recorder due to electricity points not working in my class.
- I sometimes cannot complete as much as I would like due to short periods.
- My learners are discussing well in their groups, but they do not perform well when writing on the same work.

Sivan:

- Their is a lack of group accountability. Learners are not yet really making sure that all in the group understand the work.

4.4.6 Summary of the Problem Areas

- Time-consuming
- Work not reinforced, learners do not perform well when writing about work discussed in groups.
- Lack of group accountability.

The problems reported were few. This is possibly due to the fact that we had already been running this project for nearly nine months in our classes. We all, that is, teachers and learners, were coming to grips with working in groups. We now proceeded to seeking possible solutions to our problems encountered during this third cycle.

4.4.7 Discussion on Problem Areas

We discussed/debated these identified problems and generated the following as possible solutions. These would then be implemented in the fourth cycle in an attempt to address these problems.

4.4.7.1 Time Factor

We would carefully plan the number of lessons left for the year in a realistic way. The number of teaching units would be kept to a minimum, and the amount of material to be covered could also be reduced. The number of cooperative lesson units would be reduced to about one third of the total lessons for the term.

4.4.7.2 Reinforcement of Work

To reinforce work done at school in the groups at home, we would introduce a short test (5 or 10 marks). This test would be written on the day after the work was done in class. Learners would need to reinforce work completed at home. This test could cover even just a portion of the work. Learners should be encouraged to prepare thoroughly at home. The tests would also be supplied as part of the materials to us teachers.

4.4.7.3 Group Accountability

For better group accountability, we decided that the entire group should at least obtain a minimum of 60% in the test. The mark could increase with time. Learners should therefore ensure that all group members understand the work during their drilling/coaching sessions. To enforce this group accountability, we suggested that if any member of the group does not obtain the required pass mark, then the entire group would have to be retested. Stronger members should be encouraged to assist weaker one. All groups making the grade should also then be acknowledged in some way. Their names could be pinned up on a notice

board in class, or their names read out, etc.)

4.4.8 Procedure for Cycle 4

We would then largely be retaining the process as for the third cycle. The solutions as suggested for problems experienced would be incorporated to form our revised plan of action for the fourth cycle.

Helen and I were responsible for preparing materials for the fourth cycle. The examination arrangements would be as discussed in meeting 6. I reminded teachers to persist with their data collection. As the year was drawing to a close, I told them that I would be making arrangements to survey their learners by means of a questionnaire and that I would also like to interview some of their learners. I would finalize these matters with them in due course.

I thanked Helen and Patricia and closed the meeting at 15h15.

4.4.9 Concluding Comments

In general, I found Patricia and Helen still to be enthusiastic about the research. Other demands though made them want to get over with the research as soon as possible. This had come up informally in several discussions. Patricia in particular was studying part time at U.P.E and had to also attend classes over school vacations. The research was thus an added responsibility to her already busy schedule. On the whole, these members have been great to work with. They always tried to fit in when asked to do so.

To me, the research was progressing well and according to plan. I did not think that we are able to do much more than we are doing under our present working conditions. I too, looked forward to our final cycle**.**

4.5 CYCLE 4

4.5.1 Background and Preparation

The fourth and final cycle of our research was run over the fourth term of 1996. Helen and I prepared all materials for this cycle. We took into account the various suggestions offered at the end of cycle 3 to prepare our materials for this revised plan of action.

The following outline indicated the mixture of cooperative and traditional lessons units for the fourth cycle. The specific cooperative lesson units used during this phase follows this outline.

Outline of Lesson Units for Fourth Action Cycle:

Transport Systems (Heart)

Lesson Unit	***Teaching Method***
1. Introduction	- traditional method
2. Position of heart	- traditional method
External structure	
Internal structure	
3. Valves	**- cooperative method**
Main vessels to and from heart	
4. Veins, arteries and capillaries	- traditional method
Comparison, build, functions pulse	
5. Cardiac cycle	**- cooperative method**
6. Cardiac cycle	**- cooperative method**
7. Pulmonary circulation	- traditional method
systemic circulation	
hepatic portal circulation	
coronary circulation	

(blood vessels and relevant
functions here)

Lymphatic System

Lesson Unit	***Teaching Method***
1. Introduction / origin / composition	- traditional method
2. Plan of system	**- cooperative method**
3. Functions of system	- traditional method

Cooperative Lesson Units for Fourth Action Cycle

Unit 3: - Valves of the Heart:

1.- Name the different valves found in the heart
- what is the location of each valve
- briefly describe the build of each valve
- what are the main blood vessels associated with each valve
- what specific function does each valve play

Units 5 and 6: - Cardiac Cycle

1. What is a heart or cardiac cycle?
2. What do the terms systole and diastole mean?
3. Describe the various changes / happenings that take place
during each of the following phases in the cardiac cycle:
general diastole
atrial systole
ventricular systole

4. Higher Grade learners only
Explain the role played by the S-A node and A-V node in the regulation of the heartbeat.

Unit 2: -Lymphatic system

1. Where are lymph capillaries found?
2. What is formed when these capillaries unite?
3. When is tissue fluid called lymph?
4. How do blood capillaries and lymph capillaries differ?
5. What is chyle? where is it formed?
6. Where are the thoracic and right lymphatic ducts found?
   what role do they play?

4.5.2 Fourth Reflective Session [Meeting 9]

Due to our heavy end of year school schedules and deadlines, as well as Patricia's own examinations, we planned our final reflective session to take place during the vacation on the 19 December 1996. Helen unfortunately cancelled on the last moment as her child took ill. Patricia and I continued and had a lengthy informal discussion about our final action cycle (see appendix 11 for planned agenda). I informed Patricia that I would at a later stage meet with Helen in order to gain her insights as to this cycle. I met with Helen in January to get her views on the fourth cycle. Her reflections on this cycle had been added to that which Patricia and I had discussed at our meeting.

4.5.3 General Comments on the Cycle

All three of us felt that there was once again an improvement with our implementation of the cooperative approach during this cycle. To us, this term was the most successful of all thus far.

4.5.4 Positive Aspects of the Revised Action Cycle

- The introduction of the short tests at the end of each unit was successful in making learners become more focussed on their tasks.

- The learners were more goal oriented.
- Learners were now concerned that all the members in the group master the work, as all had to achieve the specific minimum, to avoid being retested.
- Learners thus checked each other more seriously.
- Learners were now more aware of group accountability as compared to their individual progress only.
- Learners did not want to be embarrassed and therefore paid attention to each other.
- Learners in general acted more responsibly and were more focussed.
- Greater interest was shown for the work of the day.
- Learners were excited about contributing and doing well.
- Discussion was such that learners wanted to understand the work. They were also ensuring that others in the group understood.
- Learners once again preferred the mixed approach, that is combining cooperative and traditional lesson in the same chapter.
- Learners enjoyed the greater variety.
- Learners enjoyed being active participants as compared to being passive recipients in the class.

4.5.5 Problem Experienced During the Cycle

Patricia once again had major problems with regard to time. The pressure was enormous in terms of completing the syllabus and getting learners ready for the examinations. We agreed that this was not due to the cooperative approach only, but rather that her school had so many disruptions to their normal teaching programme. This would have created a pressure situation even with traditional teaching only. The cooperative method without a doubt does require more time than the traditional method. The teacher is unable to simply quicken the pace, as the pace is largely dictated by the learner. If a teacher becomes impatient, frustration sets in. Patricia's problem also stemmed from the competitive nature of her colleagues and the fairly rigid pre-determined requirement laid down by her subject head. Time was not such a great problem for me or Helen.. Our schools

certainly had fewer disruptions over the teaching year.
All three of us in general had very few problems with the revised approach in this cycle. We were in fact encouraged by the final outcome. We felt that there was definitely development over the year with the learners. They were more responsible, accountable, active and focussed. The major problems we had with fooling around, misbehaviour, noise and absenteeism were greatly reduced. Learners by the end of this cycle were serious about their learning.

4.5.6 Discussion of Problems Experienced

We felt that we teachers would have to plan much better with regard to available time. We would also have to be realistic in terms of syllabus requirements due to all the unforseen happenings at schools.

Even if we reduced the amount of lessons using cooperative learning, the spin-offs were great in that the learners had developed so many skills that they were applying even to the traditional teaching method. We were in agreement that cooperative learning should be used even at the expense of reducing syllabus content. The management at schools could be asked to be less rigid in this regard. We also acknowledged the fact that while time was still a problem, we were able to pick up the pace as we became more experienced with the cooperative method. Learners did not need as much time to settle down and get going with the work as they were now used to the procedure of cooperative learning.

4.5.7 Plans for the Future

I informed Patricia and Helen that we would most likely meet again as and when I started writing up the research. They would be part of validating what transpired during this project. Also other topics or themes that emerged would need further discussion. They agreed to this.

I thanked Patricia and Helen for their unselfish support and participation over the entire 16-month period. We promised to keep contact with each other. I do believe that Patricia and Helen were relieved that the final cycle was now over. Having been directly involved as co-researcher, I feel that I was extremely lucky in having persons like Patricia and Helen in the project. They sacrificed a lot to see the project through. Often when I thought about dropping this research, I reminded myself of the sacrifices of these two co-researchers and picked myself up again.

4.5.8 Concluding Comments

In general, the fourth and final cycle had gone very well in terms of our application of the revised plan of action. We experienced very few problems with the cooperative learning lessons as well as with the combination of cooperative and traditional lessons.

Over the year that included four cycles, we the teacher-researchers were able to experience the changes and development of a cooperative learning method largely due to the action research approach that we utilized for this research. With each cycle, we saw an improved application of the cooperative learning method. The various problems we experienced with our learners early on in the research was largely solved by the various modifications we brought about after each reflective session.

To me the research over these four cycles had progressed very well and according to plan. With the exception of losing some teacher-researchers in the project, there were no major unforseen circumstances or disruptions during the project. I am extremely grateful to the schools and teachers that stayed with the research right up to the end of the fourth cycle. Without their valuable participation, especially the honest reflective sessions, this project would not have been the same.

All of us in the team were happy that the project, as far as the empirical research was concerned, had come to an end. The many commitments of a teacher today makes it very difficult for him or her to dedicate quality time to a project of this nature. The fact that we were all positive about the final product at the end of the fourth cycle, made all our sacrifices seem worthwhile. We were proud of the fact that we were able to be both teacher and researcher, and that it was possible for us as ordinary practising teachers to be able to generate a possible new understanding to some of the many issues with regard to cooperative learning.

Photographs: Learners from Paterson High School

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CHAPTER 5

QUESTIONNAIRE RESULTS AND DISCUSSION

> ***Anyone concerned with establishing within a school the conditions necessary for change should pay particular attention to the ways in which pupils and teachers can begin to learn together.***
> ***... Pupils' own perceptions of innovation are rarely monitored, or even acknowledged, when development work is attempted in schools. Yet, these perceptions affect quite profoundly the value of the work undertaken.***
> ***(Jon Nixon, 1995:147)***

Photograph: Learners from St. James Secondary School

CHAPTER 5

QUESTIONNAIRE RESULTS AND DISCUSSION

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... Pupils' own perceptions of innovation are rarely monitored, or even acknowledged, when development work is attempted in schools. Yet, these perceptions affect quite profoundly the value of the work undertaken.
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Photograph: Learners from St. James Secondary School

5.1 INTRODUCTION

This chapter deals with the questionnaire that was completed and returned by the learners from the three schools taking part in this research project. The questionnaire deals with the learners' experiences in their Grade 10 Biology class for the entire year in which cooperative learning was used as a teaching method.

Each of the learners in our Grade 10 Biology classes was given the questionnaire to complete at home (see appendix 12). This was done towards the end of school year and with hindsight does not seem to be the best time to have administered it. This is so, because only 121 learners from a pool of about 250 returned the completed questionnaires to us teachers. The change in the school schedule where we did not see our classes regularly as with normal teaching time, the absenteeism before the examinations by learners and so on led to learners not completing and handing in the questionnaires. Also, no force was exerted on the learners to complete and return the forms. A breakdown of the 121 responses from the different schools is as follows: Newell 23, St.James 44 and Paterson 54.

In analysing the responses on the questionnaire, I entered on computer and compiled a list of all responses to each of the questions. Each questionnaire was coded and thus each question had 121 responses listed under it. All of the questions required that the learners give explanations and this made the information more suited to the qualitative research approach of this research project. This however makes it more difficult when analysing the responses because all the responses are in the learners' own words. They did not merely have to select from a list of alternatives. I have however tried to the best of my ability to read the responses carefully and to code them, giving all similar responses in a broad category the same code. I then clustered all the responses for each question under different categories as provided by the learners.

A summary of these categories is provided in this chapter together with a brief comment after each question. For Paterson and St. James, the responses were

given in Afrikaans. All the sections that were selected for this chapter were translated into English. Also, in trying to keep the responses the same as provided by the learners, I did not correct any grammatical errors, especially the sentence structure. Where it was really necessary to facilitate understanding what the learner was saying, I did affect minor changes to the response without changing the meaning in any way.

Details with regard to the structure of the questionnaire are provided in the methodology section in chapter 3.

5.2 QUESTION 1

During the first half of the year you had a whole chapter of cooperative lessons at a time. In the second half of the year we mixed cooperative lessons with traditional lessons by the teacher. Which half was better for your learning?

5.2.1 Introduction

This question was given in order to determine whether learners preferred a full chapter of cooperative learning at a time as compared to a chapter that consisted of a mixture of cooperative and traditional lessons. Of the 121 responses, 62 (51.2%) learners indicated that they preferred a chapter that combined cooperative learning with traditional teaching while 49 (40.5%) learners indicated a preference for a complete chapter of cooperative learning at a time.

5.2.2 The second half: Cooperative lessons with traditional lessons

There were a number of reasons given by the 62 learners for preferring a combination of cooperative lessons and traditional teaching.

Almost half (45%) indicated that they **understood the work better** when it was

presented this way. These learners do not come from a culture of the written word, and as one of them said, “you understand work better when it is orally explained to you”. Others commented on the group nature of the lessons and that they understood better because “we all worked together”.

A substantial number of learners (21%) still appreciated **input from the teacher**. They felt that “the teacher explains better” and that “to write down from pages was very difficult”.

Some learners (10%) liked the **group work** in its own right: “You get a chance to develop your own ideas. The teacher does not talk you to sleep”! Another gave a deeper insight that “the friends with whom I sat encouraged me. It was more pleasant because we speak in our own street language”. Some (5%), however, did not like the group work as “it was very difficult because we did it for the first time. It confuses us. Some of us were also frequently absent which made it very difficult”.

A handful (5%) enjoyed the **complementary nature** of the combination when “the learners explained. The teacher also explained”. Or as another put it, “it is also important that after such a project has been finished, the teacher must sum up all the information obtained and ratify suitable points.”

Finally, some (5%) found this approach **more interesting**, and “definitely not boring”.

5.2.3 The first half: Whole chapter of cooperative lessons

Just over 40% of the learners indicated a preference for having a complete chapter at a time utilising the cooperative learning method.

It was interesting to note that most (43%) of the learners also indicated that they were **better able to understand** the work. One learner said, “we sat in a group

and discussed the work. We understood the work better than the teacher giving a lesson".

Some (18%) of the learners felt that they were **better prepared for the examinations**. Some responded "I got the highest marks in the first half. I was passing all my monthly tests and getting great marks". Other learners (16%) found the work to be **more interesting** as "it was exciting and encouraged us learners."

Another group (10%) found the work to be **less and easier**. One learner stated, "we can also go home and study that chapter and it's not long and it's easy that way".

Some (6%) of the learners found that they **learned more or learned new things**. It was encouraging to hear "we learn more. We actually use our textbooks in our spare time".

5.2.4 Brief comment

The majority (51.2%) of learners preferred that their lessons be a combination of cooperative work and traditional lessons. There are several factors that could be attributed to this decision. Firstly, cooperative learning in general requires much more active involvement by the learner. Also, this method demanded that learners work and prepare at home as well. When the teaching methods are combined, it does create a bit more breathing space for learners. Secondly, many learners are reluctant to break free from the tried and tested traditional teaching method. Many still see work as being correct or relevant only if it is presented or endorsed by the teacher. Thus learners want to see the teacher involved as well. As most learners had found benefit in cooperative work, they have thus opted for a combination of cooperative and traditional teaching. Very few learners requested traditional teaching alone.

5.3 QUESTION 2

In the first term you were given the chance to become the expert on one section of the work. Later on you had to prepare and learn all parts of the work for discussion. Which helped you learn the work better?

5.3.1 Introduction

The intention of this question was to determine whether learners preferred preparing and learning one part of the jigsaw or the entire section for discussion in their groups. Their responses indicated that 76 (62.8%) learners favoured preparing all parts of the work while 33 (27.3%) learners favoured being the expert on one section of the work.

5.3.2 Preference for doing all parts of the work

Sixty two percent of the learners chose this option.

Nearly a quarter (24%) of the learners again cited **better understanding** for their preference. One learner stated, “it is better to answer all six questions as compared to only one because if you answer all six, you understand all the work”.

About 20% of the learners appreciated **getting others’ views and new ideas.** Some of the views given were that “many new ideas come from discussion. You can hear the other person’s views and they can correct you when you are wrong”. Contrary to this, another group (9%) preferred **working alone** because “it much easier to work alone and it allows you to have knowledge”.

A fairly large group (18%) indicated that by doing all the questions it was **better to learn**, as “you prepare the whole unit and learn for discussion, you then automatically remember it longer. It also motivates you to study”. Similarly, a

smaller grouping (5%) felt that by doing all the questions they were **forced to study**. One learner stated that "it pushed me to study and prepared me for discussions".

5.3.3 Preference for being the expert on one question

Twenty seven percent opted for doing one question only. Of the learners in this category, 24% again cited **better understanding** as their reason. One learner put it as "you had to do the work in your own way, thus I understood better" another as "where I made my own summary after doing research and condensing it, I understood better."

We **learned more** was a reason given by 21% of the learners. A learner stated that "you keep the work longer in your head. It does not let your mind wander". Another group (18%) felt that the work was **less and easier** for them as "it was better to do a small piece at a time".

Some (9%) learners preferred that **all were given a chance to contribute**. One learner said, "I think all must contribute with their answers".

A small number (6%) stated that they in fact **preferred the teacher** to explain. One learner declared "I learn better out of the mouth of the teacher".

5.3.4 Brief comment

The majority (62.8%) of learners favoured learning and preparing all parts of the work. This could mean that learners whilst enjoying the cooperative structured classroom, still wish to have control over their learning. The opting for doing only part of the work meant that they had to depend on other members. Learners, however, in spite of wanting to do all the questions, still valued the sharing and discussion components that are essential within the group structure.

5.4 QUESTION 3

There were times when the teacher placed you in a group. At other times you were allowed to form your own group. Which method of group formation did you work better in?

5.4.1 Introduction

Learners in general like sitting with their friends. During this research project they were exposed to situations where they were placed in groups by the teacher, often separated from friends and at other times they were allowed to select their own group members. The question put to them is to determine where they worked better.

Of the learners, 52 (43%) indicated that they worked better in the groups where they had selected the members themselves. Forty four (36.4%) of the learners indicated that they had worked better in the groups as formed by the teacher. A large number, 25 (20.7%) learners did not select one of the given two choices. They in fact gave other reasons, most just stating that they preferred working in groups.

5.4.2 Preference for forming their own groups

The 52 learners who preferred forming their own groups gave a number of reasons for their choice.

Nearly 30% indicated that they preferred forming their own groups because they **understand each other**. It was stated that “you understand your friends well. You will want to talk to friends that you know well”. Another learner said, “when discussing with people you understand, it’s easy to understand”.

Another large group (21%) indicated that by forming their own group they could

choose people who would work. One somewhat wise learner stated “there are learners who are not serious. I chose the ones I knew were serious”, and another said, “If you work with friends that are helpful, there ought to be no problems”.

Similarly, 14% indicated that it is **better to work with friends** because “you work better among friends” and “we help each other and learn better”.

About 10% of the learners found **communication to be better** in groups they formed themselves because “you can speak freely and are not shy to ask questions”. A further small grouping indicated that they **chose people who could help them**. In the same vein, another small group indicated a preference for forming their own group as the teacher generally would **mix non-worker with workers**.

5.4.3 Preference for teacher formed groups

For the 44 (36.4%) learners that stated it was better for their working if the teacher formed the groups, several categories of reasons were cited.

Nearly 40% of the learners feared that there would be **less working and more talking** in groups that they formed themselves. One learner bluntly stated that “if you form your own group, you play, but if the teacher places you, you do not play but learn better”.

A smaller group (14%), indicated that all generally **worked well together in the teacher’s grouping** as “it is recommended by the teacher, and learners did the required work”.

A further 14% of the learners acknowledged that **the teacher mixed the group.** This they accepted because “the teacher knows that she puts someone who will help others if they have a problem, and she avoids mixing friends”.

5.4.4 Brief comment

For this question, the majority (43%) of learners stated that they preferred forming their own groups. What I found to be of significance with the choice is that both groups wanted learners in the group that were prepared to offer their best in terms of work. No one wanted persons in their group who were lazy. The learners who preferred the teacher forming the group felt that they had further gained by making friends with other learners with whom they otherwise would not have associated.

5.5 QUESTION 4

List three things you enjoyed / liked best about working with members in your group(s) over the year.

5.5.1 Introduction

The aim of this question was to determine what aspects exactly in cooperative learning appealed to learners. Not all learners listed three things as asked. Some listed fewer than three and some even left this question unanswered. All similar responses were grouped together. The percentage therefore assigned to a particular category response was based on the number of responses and not the number of learners.

5.5.2 What learners enjoyed most

What we like best was **sharing, discussing and cooperating** with each other. This was indicated by 37% of the responses from learners where they stated, “what I like is that we were all talking”, “you get different opinions and views”, “use was made of everyone’s opinion”, “We were able to have discussions about our work”.

Nearly 20% of the learners appreciated that they **were helped to understand**. One learner puts it as “I was explained step by step until I understood and I was not afraid to ask again”. Another learner indicated “we took our time to explain the work to each other”. “They can bring you right”, is what someone had to say about her group.

About 12% of the responses indicated that learners **worked well together**. What they enjoyed was that “we were never rude to each other”, and “all in the group were dedicated”. Smaller clusters of responses showed that learners **got to know each other,** that they **communicated well with each other**, as well as that they **enjoyed working in the group.** One learner summed it up as “you are relaxed and calm, because you communicate with your friends”.

5.5.3 Brief comment

Learners reported that they liked working in groups, sharing, discussing and cooperating with others. They got to know other learners better and in general felt that this arrangement also greatly facilitated their understanding of the task at hand.

5.6 QUESTION 5

List three of the main problems you had with members of your group(s) over the year.

5.6.1 Introduction

For this question, as with the previous one, not all learners listed three problems as asked. The number of responses ranged from 0 to 3. In total, 264 responses were listed by the learners and placed under various categories.

5.6.2 Main problems experienced

Over one-third (37%) of the responses referred to learners **who do not want to work**. Some of the main complaints were that: “some learners don’t do their work”, “some did not prepare and depended on other”, “lazy learners were a big problem”, and “there are those who just wait for answers”.

About 15% of the responses indicated that **absenteeism** was something that was disliked. One reason given was “if one was absent, we who were present were much inconvenienced”. Another learner stated that when someone was absent and later returned, time was wasted as they “had to first catch up”.
Fooling around, noise and idle chat was reported by about 17% as problems in their group. Learners stated that “some learners are playful and do not listen when work is being discussed”, another reported that “jokes were made during lessons”. It was also stated that “some made a lot of noise”, and that this often led to “a loss of concentration” in the group.

A small group (6%) complained about some members **being shy** to talk in the group. This was noticed as “some don’t ask questions and don’t give answers”. Some learners were reluctant to “speak in front of the class”.

About 11% of the learners indicated that they had **no problems** as everything had progressed smoothly in their group.

5.6.3 Brief comment

One of the main problems cited by learners in terms of group work is that they disliked it immensely when other learners were lazy or absent on a regular basis. This shows quite a mature attitude towards their learning as these are the very things that upsets us teachers when we use the traditional teaching method.

5.7 QUESTION 6

In the last term, you had to write a short test after each cooperative lesson unit. In what way did this help you and your group learn the work?

5.7.1 Introduction

The short test was introduced within the action framework in order to try and get learners to be more responsible for their own work and to be more accountable for the entire group's performance. Those groups who did not meet a specific minimum had to sit for a re-test. This question therefore tries to determine how learners had reacted to the test.

5.7.2 How the test helped

Just over one-third (35%) of the learners indicated that the tests had been helpful in **preparing them for the examinations.** One delighted learner said, "whenever I studied, I performed outstandingly. The short tests helped a lot". Another learner similarly stated "I got better marks as the tests helped me to understand the work". Another learner commented that "the short tests usually stayed in my mind".

Nearly a quarter (24%) of the learners felt that the tests **helped them to learn or improve.** One learner stated that it helped him because he "went and learned" in preparation for the test. Similarly, another learner indicated that he now was "forced to study". Learners also indicated that they "encouraged each other to study" within the group.

About 20% of the learners felt that their **understanding had improved** because of the short tests. One learner proudly stated "everything became clear in my mind". Another learner said that it was an opportunity to see if "all understood the

work".

A further 14% of the learners simply stated that **it helped.** One response was "it helped most learners, especially me. We learned together".

5.7.3 Brief comment

It was encouraging to note that nearly all the learners reported that they had gained from the test. This is not common as most learners dislike tests. Here, learners report being better prepared for examinations, improvement in work and better understanding.

5.8 QUESTION 7

What did you do when you could not understand what another group member was discussing with you?

5.8.1 Responses offered

The purpose of this question was to see which of the support structures available in the class would be utilized by learners when she/he encountered a problem. A variety of responses were listed by learners to indicate how they would deal with the matter.

Nearly 30% of the learners indicated that they would ask their group mates to repeat or re-explain what they had been discussing if they did not understand it the first time. One learner said that she would ask the person to explain in the **simplest way possible** or to make it more **practical**. About 17% of the learners said that they would ask someone else in the group for an explanation if they did not understand.

Some learners (16%) turned to the teacher for help when they experienced problems. As one learner put it, “I would **consult the teacher** to help me”. Other (13%) more independent learners stated that they would **refer to their textbook** for help.

A small number (3%) decided that they would ask for help from members in other groups. There were also a few who said that they did nothing about the problem while another small group stated that they got angry if they did not understand.

5.8.2 Brief comment

The response to this question was very encouraging because most learners indicated that they would ask for help if they did not understand something. Whilst it was good to note that the first reaction was to ask other learners within the group or other groups, it was also acceptable in these early stages to note that some learners had turned to the teacher for help. This is very different from the traditional method where learners generally do nothing if they do not understand something.

5.9. QUESTION 8

How do you suggest we can improve on the cooperative learning that we did this year?

5.9.1 Responses offered

This question was asked with the aim of getting feedback from the learners in order to consider improvements to the implementation of cooperative learning in the classroom. Several responses were offered:

A large group (23%) of learners had a really **good experience** with the

introduction to cooperative work and suggested that the programme stays as is with no changes. One learner stated that “the group work was perfect this year. For me, **no changes need take place**”. Another put it as, “I liked the way we learned”.

Other (12%) more perceptive learners indicated that an improvement could be affected by **improving the discipline**. Advice to the teacher was to be “more strict with learners”. Other things pointed out to the teacher as detrimental to learning were “**noise level and absenteeism**”. One learner indicated that even the teacher should be more disciplined by “circulating between desks and checking that all were concentrating”.

Just over 8% of the learners felt that group formation also needed attention. The suggestions offered ranged from **mixing learners by ability**, to not allowing learners to choose their own group mates. The teacher was also again asked to ensure that all in the group make a considerable contribution.

A group (7%) of learners felt that the content needed to be **more practical** in nature. Learners want to see and identify more with the work. Because they become frustrated with abstract concepts, one learner suggested that “there should be more observation work”.

Quite a large group (17%) offered no response to this question while another 6% stated that they did not like cooperative work and that they preferred “the teacher to give the lesson”. Another even stated that “we should go back to the old way”.

5.9.2 Brief Comment

While the majority of responses indicated that learners did not want any changes, it was encouraging to note that some learners were calling for better discipline in order to improve the approach. Also, learners were asking that we ensure that learners were helping each other. This seems again to be positive and a mature

approach towards their learning.

5.10 QUESTION 9

Did cooperative learning allow you to get to know your classmates better?

5.10.1 Introduction

The intention of this question was to determine if learners learned more about each other when they worked together in the cooperative learning method. From the learner's responses it was found that 117 (96.7%) indicated that they did in fact get to know their classmates better through cooperative learning. Only 3 (2.5%) of the learners indicated that they did not get to know their classmates better.

5.10.2 Discussion

For the large majority that indicated yes, a variety of reasons were forthcoming.

A quarter of the learners indicated that they **learned more about each other** and that they even understood each other better in cooperative structured lessons. Some responses given were, "I learned that we all make mistakes and that it's not a joke if you answer incorrectly". Another learner stated "in my group there was an African learner and cooperative work allowed us to learn more about each other".

Another group (12%) of learners stated that they learned more about their classmates through listening to their views in the discussions that took place. A further 11% stated that they did not really know their group mates prior to the introduction of cooperative work. This situation however changed when the teacher placed learners together. Their interactions allowed them to get to know each other better.

There were learners (9%) who indicated that they **became good friends** through their working together. Another group (9%) stated that communication between members had greatly improved, while about 5% indicated that by helping each other, they got to know each other.

Two categories of learners that also benefited from cooperative learning were those who are **normally shy** and keep others at a distance and those who are disliked for some reason or the other. Learners (5%) reported that group work allowed them to get to know those shy learners. Another group (4%) stated that cooperative learning had given them a chance to **change their views** about learners that they previously disliked.

Just fewer than 5% stated that **better understanding** of each other led to getting to know others better.

For those 3 learners who indicate that they did not get to know their classmates better, the following responses were offered: “There was no change in my knowing them, I already knew them, They were shy and did not speak”.

5.10.3 Brief comment

Nearly all the learners reported that they **got to know other learners** in their class much better through the use of cooperative learning. This was extremely encouraging as cooperative learning largely relies on learners working well together. Most of the things that they learned about and from each other were positive things, which in general contribute to their full learning experience.

5.11 QUESTION 10

Did cooperative learning make you in any way change your opinion with regard to the ability of any other member(s) in your group?

5.11.1 Introduction and discussion

With this question I wanted to determine if the learners had in any way changed what may have been a preconceived opinion of their classmates after having worked with them more closely in the cooperative lesson structures. From the responses, it was found that 61 (50.4%) indicated that they had changed their opinions of classmates and 54 (44.6%) indicated that they had not.

For those learners who had changed their opinions, a variety of responses were given. About 15% had changed their opinions after **receiving or giving help**. One learner stated it as "if I knew that the member was wrong somewhere, I would correct him".

Other learners (8%) changed their opinions in a negative way because learners stayed **absent** and another 8% because learners were **lazy**. One learner said that he had thought some of the others to be serious about their work, but they were in fact lazy. Contrary to this, another group (8%) discovered that their previous views about others being difficult was not true. Similarly, 7% discovered that some learners were **not lazy** as previously thought. One learner stated it as "I thought that the teacher would place me with learners who did not want to learn or do homework, but I got to know them and did not expect that we would work so well together".

A further small group (7%) indicated that by getting to understand each other better, they were able to change their opinions. Various other small groups of less than 5% gave several other reasons for changing their views. Some of these are: sharing, better communication and getting to know more.

For the 54 learners whose opinions had not changed, a variety of responses were also given. Nearly 17% of the learners felt that everything was working well and that there was no need to change their view. Similarly another 14% stated that all were contributing as “each did a part of the work”.

Another 7% stated that all of them **enjoyed** working together and that they did not see any reason to change. A further two groups of 7% each indicated that they had worked well because of good understanding in the group and because of the sharing that took place. There was thus no need to change the views that they held.

5.11.2 Brief comment

For this question there was a variety of responses. Some learners began to change their views about others in a negative way. What was in fact good about this is that it was being done for the correct reasons. Learners disliked others being lazy or habitually absent, etc. They also began to see worth in others whom they had previously not thought much of.

5.12 QUESTION 11

Did cooperative learning help you understand the work you were doing?

5.12.1 Introduction and discussion

The aim of this question was to find out if learners thought they had understood the work done over the year when they used the cooperative learning method. I was hoping that learners would be able to differentiate between possibly enjoying the cooperative approach and its value to understand the work at hand. From the learners responses, it was found that 103 (85.1%) indicated that cooperative learning did help them to understand the work. 17 (14%) learners indicated that this was not the case for them.

For those learners who felt that cooperative learning had helped them, a variety of responses were offered. Some (13%) learners believed that cooperative work had made the work **easier** for them. One learner described it as "the easy method because you give reasons for what you are doing". A further 11% saw the **sharing of ideas and views** as having helped them. "Everyone had an explanation for something, we then used the best explanation", was what one learner had to say.

About 10% attributed their improved understanding to having done the work **by themselves**. One learner stated that she gained **more confidence** in this way. Learners (9%) also spoke of the ready help at hand from group mates. One learner stated, "it's easy to ask other members about something I don't understand during cooperative lessons".

Other (8%) learners thought that the greater amount of **communication or discussion** had helped them. One learner showed this preference by saying, "it's better talking than reading. When you talk with somebody about something, you understand better than reading alone". Another group (8%) believed that they **learned more** in the cooperative way because, "sometimes I don' understand the chapter as the teacher teaches it, but I learn more in the cooperative way".

Two smaller groupings of 7% and 6% respectively felt that cooperative work had helped them to **pass tests** and that explanations were **simplified** during in this method. One learner stated that friends often gave simple explanations that were understandable to them.

For the small group (14%) that felt that their understanding had not improved, the following reasons were offered. The majority (41%) indicated that they **did not understand** during cooperative work. One learner even gave a reason by stating, "I understood nothing because I did not give my full attention". Another group (18%) felt that only the teacher could make them understand as "It is boring to

work without the teacher". Some other learners either gave no reason or indicated that they did not know why cooperative learning did not help them to understand the work.

5.12.2 Brief comment

Most learners (85.1%) reported that they had understood the work much better. Understanding is the one thing that has been repeatedly mentioned by learners with regard to the questions put to them in terms of cooperative learning. Frequently learners indicated that discussion and the greater demands placed on them to work has led to this increased understanding of their work.

5.13 QUESTION 12

Did your participation in your group make you a more confident person in any way?

5.13.1 Introduction and discussion

With this question I was trying to find out if the learners had found their experiences gained in the cooperative lessons to make them more confident persons. The cooperative structure had demanded that learners be responsible and accountable and it was hoped that the learners would assimilate these qualities and apply them to other situations in general.

One hundred and one (83.5%) learners claimed that their participation in their groups had made them more confident persons. Thirteen (10.7%) of the learners reported that they did not become more confident.

A large group (28%) of learners felt that it was directly as a result of their **group participation** that their confidence was enhanced. One learner stated that "if you

are always in your group and participate, you will be confident". Another stated that "when the teacher gave lessons, I never answered, but now in my group I discuss and give answers". A further 17% felt that it was their **contributing and sharing** that helped with their confidence building. The **support offered** by teammates helped another 7% of learners. One learner said, "my group convinced me that I could do it". A further 7% became confident as they began to realise that they too could **do it.** One learner stated" you never knew that you could prepare, discuss and even give lessons". The **encouragement** given to each other was a confidence builder for another 5% of the learners. One learner shared that "there were many learners who were scared to say something but we encouraged them to make their contributions".

For the 13 learners whose confidence had not improved, the following reasons were offered. For 46%, there was a **lack of cooperation** in the group, "everyone wants to do their own thing and don't listen to anyone". Another 2 learners felt that too much depended on them and thus they **felt pressured**. A further 2 learners indicated that they had not gained more confidence as they **already had confidence** in themselves.

5.13.2 Brief Comment

Eighty three percent of the learners stated that they became more confident with the use of cooperative learning. The demands placed on them to discuss with each other, report to the class as a whole was a major contributing factor to improved confidence. A better understanding of the work also made learners feel more at ease in communicating in their groups, with the teacher and the class as a whole. Being able to summon help from a groupmate also played a role as learners in general feel embarrassed to ask the teacher when they do not understand something.

5.14 QUESTION 13

Do you think you would have enjoyed your year any better in the Grade 10 Biology class if you did not have cooperative lessons?

5.14.1 Introduction and discussion

The aim of this question was to determine if the learners would have preferred having only traditional lessons for the year. Further, responses to this question would probably also indicate if learners found the year to be problematic to them because of the use of cooperative lessons.

An analysis of the responses received for this question showed that 95 (78.5%) learners felt that they would not have enjoyed their year in the Biology class any better if they did not have cooperative learning. 25 (20.7%) learners did however feel that they would have enjoyed their year better without the use of cooperative learning.

16% of the learners indicated that cooperative lessons were **interesting and fun** for them. A further 11% concurred by stating that it would have been **boring** without cooperative work. One learner said, “it would be boring to listen to the teacher’s voice each day, with different members it was better”. Others (14%) said that they had enjoyed their year because they **understood** the work in class. Other reasons offered was that it was **good to communicate, that it helped,** and that we **got to know our classmates better.**

For those learners who indicated that their year could have been better, 48% felt that the **teacher teaches better**. One learner said, “I enjoyed Biology when the teacher explained”. **Behavioural problems** were cited by another group (8%) for not enjoying the year. One learner described his frustration by stating, “The **noise** and **lack of respect** made me feel pressured”. Another group (8%) indicated a

preference for **working alone** because, “we won’t have to wait for anybody as non-participation affects us”.

5.14.2 Brief comment

Most learners (78.5%) enjoyed their year with the introduction of cooperative work. An important fact to remember is that the cooperative learning programme through our action research was being improved upon throughout the year. This was not so obvious to learners. In spite of the problems experienced initially, the learners still liked this approach to learning. For us teachers to hear that the work had been interesting, fun, not boring, etc. is indeed encouraging, especially in the secondary school where learners are so reluctant to actually get involved with their learning.

5.15 QUESTION 14

Would you like to continue with cooperative learning next year?

5.15.1 Introduction and discussion

For this question, 96 (79.3%) learners indicated that they would like to continue with cooperative learning the following year whilst 22 (18.2%) learners indicated that they would not.

For the learners that indicated that they would like to continue with cooperative learning, a variety of reasons were once again given.

Just over 20% of the learners indicated that they **enjoyed group** work and were therefore willing and eager to continue with it. A further 20% said that it was an **easy way** for them to understand their work. One learner felt that she would “understand the work every year” if she continued with cooperative work. Similarly, a group (14%) thought that the cooperative method was a **good way of**

working in class. One learner felt that the "chapters became more clear" to her. Another group (18%) stated that this method had helped them to improve. One learner felt that it was specifically due to cooperative learning that she "improved in the Biology class". Another felt that it would help them with the end of year examinations. A further 8% of the learners indicated that they were now **more confident** because of cooperative learning.

A small group (6%) felt that they would **learn more** when using this method.

The following were offered as reasons for the group who did not want to continue with cooperative learning: A group (27%) indicated that they preferred the traditional method of lessons as presented by the teacher. "It was better when the teacher gave lessons" was a response from one learner.

Two other groupings of 23% each indicated that they **did not understand** or that they did not like cooperative learning. One learner who did not like the method gave the following reason: "it takes me long to understand and I don't enjoy it".

A few small groupings of just under 5% each indicated that the work was a lot, that some don't want to learn and that they preferred working on their own.

5.15.2 Brief comment

The majority (79.3%) of learners indicated that they would like to continue with cooperative learning. This is in line with the positive responses that cooperative learning has received in all the other questions put to them. It is important to note that their wanting to continue is being linked to their improved learning. This is extremely encouraging for the cooperative approach to teaching.

5.16 QUESTION 15

Do you think that other learners in other subjects and Grades would find it helpful to have cooperative structured lessons?

5.16.1 Introduction and discussion

The purpose of this question was to try and get some feedback from the learners with regard to their opinion as to whether they thought others learners would benefit from cooperative learning.

From the learner responses, it was found that 106 (87.6%) learners felt that other learners would benefit from cooperative learning and just 12 (9.9%) of the learners felt that other learners would not benefit.

For the large majority that indicated that others too would find cooperative learning helpful, the following reasons were given: It would be an **easy method** for them to understand the work; they would **enjoy it**; it would **help them**; it would **prepare them for examinations** and it would make them **more responsible**.

Some of the reasons given by the learners also indicated that learners should not be lazy when using the cooperative method. They also said that teamwork was better than working alone.

For the group that felt others would not enjoy cooperative work, the reason that some won't like it was offered. One learner said that "all won't enjoy it and it will be boring". Another learner said, "other subjects are different to Biology". Some minor groupings also indicated that learners would find it to be a lot of work.

5.16.2 Brief Comment

Eighty eight percent of the learners felt that other learners would benefit from the

experiences that cooperative learning could offer. They saw the approach to be manageable by other learners and applicable to other subjects as well. Again, the positive reasons cited such as, it is easier, makes you more responsible, it is more enjoyable, etc. for wanting others to be exposed to it, is encouraging.

5.17 QUESTION 16

Would you like to do cooperative work in other subjects too?

5.17.1 Introduction and discussion

This question was asked with the aim of finding out if learners were able to see any benefit in doing cooperative learning in other subjects as well. They would have to draw on their experiences gained during this year's work in Biology to decide on cooperative learning's application to other subjects.

Ninety (74.4%) learner responses indicated that they would like to do cooperative work in other subjects as well. Thirty (24.8%) of the learners felt that they would not want to do cooperative work in other subjects.

For those who wished to broaden their experiences with cooperative learning in other subjects as well, the same categories of reasons as already given by them for other questions emerged again. These included **improved understanding**, that it would help them, it would help with examinations, the **work would be easier** and that it was **better for learning**. One learner stated that some other subjects could do with more discussion in class. Another learner felt that the **independence** they gained in Biology would be good to have in other subjects too.

There were a few learners who felt that the cooperative method should be extended to other specific subjects only. Learners in general wanted it in the

study subjects such as History and Business Economics.

For those learners who did not wish to have it in other subjects too, the following reasons were offered: “I don’t want it as I don’t enjoy it”. One learner here stated that “it has been ineffective” for him.

Another group (17%) stated that they preferred the teacher to give the lessons as “subjects like mathematics must be done by the teacher”. A small group also indicated that they wanted cooperative learning in Biology only while some other learners felt that doing long questions in the cooperative method would prove to be too difficult.

5.17.2 Brief Comment

Seventy five percent of the learners felt that they could benefit if cooperative learning was done in other subjects too. Some felt that it had use especially with study subjects. There were concerns about its use where long questions (essay type) are concerned. However there was a willingness to give it a try.

5.18 TABLE 1: SUMMARY OF QUESTIONNAIRE RESULTS

Qu 1	Prefer cooperative lessons combined with traditional	51.2%	Prefer a whole chapter on cooperative learning	40.5%	Other	8.3%
Qu 2	Prefer doing all parts of the work	62.8%	Prefer being the expert on one section	27.3%	Other	9.9%
Qu 3	Prefer forming my own group	43%	Prefer teacher forming the group	36.4%	Other	20.7%
Qu 4	List three things you liked about working in your group(s)		- sharing / discussing - Receiving help - Working well together			37.0% 19.7% 11.8%
Qu 5	List three main problems with members in the group(s)		- Some don't work - Learners that are absent - Fooling around			36.7% 14.4% 11.8%
Qu 6	In what way did the short test help you learn the work?		- Preparation for examinations - Helped us to learn - Understanding improved			34.6% 24.1% 9.50%
Qu 7	What did you do when you did not understand someone in your group?		- Asked them to repeat - Asked others in the group - Asked teacher for help			29.8% 16.5% 15.7%
Qu 8	How do you suggest we can improve on cooperative learning?		- No changes suggested - Discipline to improve - Changes in group composition			22.3% 12.4% 8.30%
Qu 9	I got to know my classmates better	96.7%	I did not get to know my classmates better	2.50%	Other	0.80%
Qu 10	I changed my opinion about others	50.4%	I did not change my opinion about others	44.6%	Other	5.0%
Qu 11	Cooperative learning helped me understand better	85.1%	C/l did not help me understand better	14.0%	Other	0.80%
Qu 12	I became more confident	83.5%	Not more confident	13.0%	Other	5.80%
Qu 13	I would not have enjoyed my year better without c/l	78.5%	I would have enjoyed my year better without c/l	20.7%	Other	0.80%
Qu 14	I would like to continue with cooperative learning	79.3%	I would not like to continue with cooperative learning	18.2%	Other	2.50%
Qu 15	Others would find cooperative learning helpful	87.6%	Others would not find c/l helpful	9.90%	Other	2.50%
Qu 16	I would like cooperative learning in other subjects too	74.4%	I would not like c/l in other subjects too	24.8%	Other	0.80%

5.19 CONCLUDING COMMENTS

In this research project, which is qualitative, I have made use of a questionnaire to determine the perceptions of the learners in our grade ten Biology classes. As mentioned earlier, all of the questions required the learners to either give a reason or an explanation when answering a question. This gave me a good understanding of how the learners actually experienced cooperative learning over the year of implementation. The data therefore by and large provides information that is qualitative in nature. I have however, also looked at the data from a quantitative perspective.

My overall impression of the data is that the learners had had a very positive experience with cooperative learning over the year. The data also shows that these experiences had made an impact on the learners in several different areas.

In terms of the academic performance of the learners, which is still today one of the first concerns of teachers, parents and learners, the data showed that learners felt that cooperative learning had allowed them to better understand the work. They also stated that they had become much more confident. The improved understanding and confidence tells me as an experienced teacher, that the learners had a better chance to improve their academic results. No matter what the question was, learners always in their responses looked at it from the point of how it enhanced or inhibited their learning. This persistent focussing on the learning experience was to me a mature way of looking at things for a Grade 10 learner.

The data also confirms that the learners had a very positive experience in terms of relating or social skills. Nearly all the responses indicated that learners had gotten to know their classmates better. Many of these new positive ties were extended beyond the confines of the classroom. About half of the learners had indicated that they had changed their preconceived opinions of fellow classmates, with most being for positive reasons. Others who did not change their opinion stated that

they had known their fellow classmates well as they had been progressing together over the years.

The positive outcome with regard to social skills has been further elucidated with the responses to the question of listing things that learners liked best about working in groups. Here the learners' main response was that they liked sharing and/or discussing with each other. Learners also responded in another question that they felt free to communicate with members in their group, other groups or the teacher when they did not understand that which was being discussed.

Some of the negative reactions that learners had reported towards each other within this social framework stemmed largely from some learners feeling let down when others did not do their prescribed work, or when they absented themselves or fooled around when work had to be done. In general, it is my view that learners have through their own experiences learned that such actions are unacceptable and are incompatible with the learning experience.

Several questions had been put to the learners with regard to their overall impressions and future applicability of cooperative learning for themselves and learners who had as yet not experienced it. For all these questions the learners felt that cooperative learning could make a considerable contribution. Firstly, they did not feel that their year would have been any more enjoyable if they did not experience cooperative learning. Further, a very large number indicated that they would like to continue with cooperative learning and they were also keen to extend this experience to other subjects as well. Consistent with this view, they also indicated that other learners would find cooperative learning to be helpful.

I also feel the need to state that I had found the responses to be honest as the learners had not in any way attempted to distort what they felt. In some cases the responses were totally unflattering towards us teacher or classmates. It is possible that the timing of the questionnaire also played a role here. Learners had completed this questionnaire at the end of the year when the teaching programme

had already come to an end.

While the data indicates a strong support for cooperative learning as experienced by the learners, it is also clear that learners do not want teachers to play too minor a role. Learners prefer a combination of cooperative learning and traditional teaching spread across a particular chapter. Given our history in the classroom where learners largely solely experience traditional teaching, it is understandable that learners feel the need for active involvement by the teacher in lessons.

The data does indicate that a small number of learners do not like or want to continue with cooperative learning. In most cases here, learners have indicated that they prefer lessons being taught by the teacher. It must be remembered that cooperative learning as introduced during this research had demanded much more from the learners as compared to the traditional teaching model. Learners now had to quickly adapt to being a more active participant as compared to a passive recipient. This sentiment was also alluded to by some learners' response to the question of whether other learners would find cooperative learning helpful. He stated: "If they want to work and are not playful, they will enjoy cooperative work very much".

CHAPTER 6
DISCUSSION OF LEARNER INTERVIEWS

Listen to the voice of the students. They are not afraid to talk about what actually happens in school.
(Herbert Kohl, 1969)

... Teachers need to show that they are listening and that they are willing, if necessary, to rethink their own attitudes in the light of the pupils' own insights. In that way dialogue becomes a vehicle for change. There is, after all, no point in asking pupils for their opinions if one is unwilling to respond to what they are saying. Pupils see through such a ploy. They realise that it has little, if anything, to do with genuine collaboration and quickly write it off as a waste of time.
(Jon Nixon, 1995:148)

Photograph: Learners from St. James Secondary School

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Photograph: Learners from St. James Secondary School

6.1 INTRODUCTION

As part of gathering data on the learner's perception of the cooperative learning experience, I interviewed a sample of learners from our three participating schools. This information was to supplement that which was obtained from the learner questionnaires. The interviews would give me an opportunity to further probe responses that were given in the questionnaire. As this is a qualitative study, I also thought that it would be more appropriate to speak directly to the learners as I sometimes got the impression that learners did not fully understand a question asked in the questionnaire.

Helen and Patricia arranged the interviews for Newell and St. James respectively and I arranged those for my own learners. I conducted all three interview sessions on my own, that is without the presence of Helen and Patricia. I wanted the learners to be honest about their feelings with regard to the cooperative method and did not want them to feel threatened by the presence of their teacher. I had wanted to conduct the interviews immediately after our fourth and final cycle, but it did not work out fully as intended. I had to wait until the final examinations were completed, so as not to disrupt the learners' study programme. This period is also characteristic of high absentee rates at all three our schools. Getting hold of the learners posed a problem. However, on the proposed days, the following numbers of learners showed up and were interviewed in different sessions: Newell - 6 learners, Paterson - 5 learners and St. James - 2 learners.

These were learners that responded to the request by us to interview them, and one could possibly anticipate that they were part of those who had experienced cooperative learning in a positive way. I did however find the information of the interviews to be very similar to that which was given on the questionnaires by the learners. The learners were very enthusiastic to share their experiences with me. I once again, as with the questionnaires, found the learners to be extremely honest. They did not in any way seem to distort information and they had no

problem in differing with each other when they felt it to be appropriate. I had also asked them to reflect on the experiences of not only themselves, but that of their classmates as well when answering a question.

During the interviews, I used the questions of the questionnaire as a basis for discussion with the learners. I did however now have the opportunity to further probe or seek clarity on certain things that the learners were saying. I did seem to chat a bit more in detail with the two learners of St. James because they were only two and I could ask them much more in the time limit that I had set myself. For both St. James and Paterson the learners spoke in Afrikaans and I translated this as best as possible to keep their responses as true as I could. The discussion that now follows described how the learners who were interviewed felt about their experience with cooperative learning in their Grade 10 Biology class. See appendix 13 for a full translated transcript of the learner interviews.

6.2 LEARNERS' IMPRESSIONS IN GENERAL

Learners were extremely positive about their experiences with the cooperative teaching method. They felt good about it as it had affected their learning in various ways. One learner indicated that he felt inspired with this way of working in class and another said he started using various books and no longer limited his work to the prescribed textbook. This method held their concentration better and they felt less inclined to feel *sleepy* in class. A learner who had been repeating the grade indicated that his year was very different and much more enjoyable. The work was no longer tedious or uninteresting. Learners in general enjoyed the group discussions that were characteristic of the cooperative method.

A major difference between the old and new way of working in class as far as the learners were concerned is that they were now active participants in their learning experience. Learners reported that they did not like being passive recipients of information when the teacher worked alone as it often led to boredom. They also indicate that the active participation led to better understanding of the work at

hand.

6.3 LIKES AND DISLIKES OF COOPERATIVE LEARNING

Some of the things that learners liked about cooperative learning includes: that they communicated in class with each other and thus got to know each other much better; that the groups changed over the year; that they were able to work at the own pace and not necessarily wait on the teacher; that they were continuously being prepared for the examinations; that there were mechanisms to ensure that they understood the work; that they were given the chance to explain the work to others and to ask questions themselves. Learners liked that they found the cooperative method to be easy and that they were able to approach the teacher when they needed help. A learner stated that often the teacher would consider their asking questions a waste of time in the traditional method.

The cooperative method required that learners prepared in advance at home and that they actively participated in the group discussions. The failure by certain members of the group to adhere to these requirements was disliked by other members. Some learners did not like it when others fooled around and/or displayed poor behaviour, especially when it hindered work. Those learners who were shy were urged to fulfil their group obligations by their teammates and where this failed, the teacher was called in to help. The thing that learners disliked most was when a group member was absent. The absence of one member often placed greater demands on the rest of the team.

6.4 SOME POSITIVE EFFECTS OF COOPERATIVE LEARNING AS EXPERIENCED BY LEARNERS

Learners in general, as mentioned before were extremely positive about their cooperative learning experience. Some of the features that made an impact on the learners are commented on here:

Learners repeatedly reported having *understood* the work better. This factor to a large extent contributed to learners having liked the cooperative method. In probing learners for possible reasons for this improved understanding, the following emerged: Learners felt that their being active, having to do the work by themselves to explain to others was a contributing factor. There were many more demands placed on the learner to be focussed on work with this method. The discussion in groups where learners often used their own uncomplicated way to explain to each other seemed to have helped them. Learners also felt free to request explanations from fellow teammates repeatedly until they understood the work. This is very different from the traditional method where learners often feel embarrassed to ask the teacher to re-explain something. Better understanding invariably led to learners getting better marks in their tests and examinations. This in turn further motivated or inspired learners to try even harder.

Learners reported that they were more at *ease or relaxed* with the cooperative method. It was their view that the teacher too was more relaxed and approachable. A particular learner stated that she felt more at ease because she could use her own manner of speaking without worrying if her words were correct or not. They were able to work at their own pace and sometimes even had a chance to discuss their own private matters. Learners however, were quick to point out that they did not often have time for idle chat and that it only occurred after their stipulated work had been completed. The fact that there were so many fellow group mates to help out in times of need made the learners feel less pressure on themselves.

The *relationship between learner and teacher* was quite different with the cooperative approach. Learners reported that they were no longer scared to interact with the teacher. They stated that with the traditional lessons the teacher was always anxious to keep their attention and often became frustrated when she struggled to do so. Learners also report that their minds often wandered during traditional lessons. However, during cooperative lessons, the teacher's role was

that of a guide, facilitating progress in the class. Learners were eager to listen to the teacher's advice to ensure that they knew what to do. At the end of the chapter when the teacher provided a summary of the answers, learners were once again eager to check if their answers were correct. Learners thus report that there was a better understanding between them and the teacher in the cooperative method of learning. One learner stated it as "with cooperative learning we were more confident with the teacher and she had more confidence in us", another learner similarly said "with cooperative learning she had more confidence in us and she got to know us better".

The support that learners received from each other bolstered their *confidence*. Learners began to be less afraid of making mistakes or for fear of being ridiculed. Rather, they welcomed new ideas and the views of others. They felt that this was much better than simply getting the single view of the teacher. The discussion or debate around these different views within the safety of the group often led to improved understanding and ultimately enhanced self confidence. One learner said, "I had more confidence in myself and when I did not understand I asked my group for help". Learners largely attribute their improved confidence to their having prepared the work on their own for discussion. I think because learners began to see an improvement in their own understanding and self confidence, they began to also see the cooperative method as being more *interesting*.

Learners sometimes found themselves placed in groups by the teacher with other members with whom they had no previous contact. Although some preferred working with their close friends, they later began to appreciate the opportunity to *get to know other classmates* as well. This made the work more interesting because they began to learn more about others and themselves, often without even realising it. Learners indicated that they respected teammates opinions and points of view. A particular learner indicated that he would respect another view even if it was incorrect, the important thing was that they should all attempt to do the work and not simply report to class hoping to get answers. They were eager to help out when requested to do so. As learners began to get to know their

teammates better in terms of personal strengths and weaknesses, they began to be *more supportive of each other*. A particular learner indicated that one should not judge other learners on their looks as it could be deceiving.

The opportunity to assist teammates further enhanced the feeling of *self worth.* Learners felt good about being able to help others. Some even likened this kind of experience to playing the role of teacher in the group. Assisting fellow group members sometimes took the form of encouraging them when they failed to keep up or complete the required work. This encouragement ranged from telling learners how important it was to work to trying to scare them by telling them how undesirable it was to be repeating the grade.

Learners indicated that they were *more in control* of their learning with the cooperative method. This aroused some learners to work more on their own. Some learners indicated that they worked ahead on the prescribed questions without being asked to do so and in this way felt more responsible.

6.5 GROUP FORMATION PREFERENCE

Learner responses to whether they preferred forming their own groups or whether they preferred the groups formed by the teacher showed that there were supporters for both methods of group formation. The reason that learners gave for wanting to form their own groups was that they worked better with people they understood. At times too, they had been grouped with learners who were reluctant to work. Other learners preferred the teacher's grouping because they state that their friends were often playful which retarded progress. Learners also acknowledge that they got to know other learners better because they had been placed with them. This also at times developed into new friendships. A learner stated that the teacher generally would group learners according to ability which helped the weaker members in the group.

6.6 BEING THE EXPERT

The learners in general preferred working out and discussing all the prescribed questions as opposed to becoming the expert on one section only. This preference developed over time as they got a better understanding of the work when they worked out the entire unit by themselves. Learners still had the opportunity for discussion, but they no longer had to simply listen in silence while another member was presenting, as they could contribute to the discussion. It also emerged that learners could now observe if the presenting learner was on track with his explanation as they had knowledge of what was being discussed. A further important point was that an absentee learner was no longer a major problem for the group as they could continue relatively unhindered with the discussions.

6.7 THE CONTINUATION OF COOPERATIVE LEARNING

Learners indicated clearly that they did not wish to continue classes with traditional lessons only as they found it to be uninteresting. While some learners clearly favoured the cooperative method, there were others who indicated a preference for a combination of the two teaching methods. One particular learner stated that cooperative learning had motivated her to do Biology on the Higher Grade. Other learners indicated that they preferred the cooperative method because it facilitated their understanding, helped them to get to know other learners and afforded them a chance to improve.

Most learners indicated that they would like the cooperative learning method to be used in other subjects as well. While a few indicated that they would like all their subjects taught in the cooperative method, the majority felt that it should be extended to include the study subjects such as History and Business Economics. Most of the learners indicated that they would like to continue with the cooperative method in their next grade as well.

6.8 FURTHER IMPROVEMENTS

Most learners were at a loss for words when they were asked how we could improve on the cooperative method. Many of them I think were simply excited at having been offered an alternative to the traditional method of teaching. With prompting I was eventually able to note the following areas where they thought we could further improve: lazy learners in the groups need attention; the questions should be clear for all to understand; language should be simple and not too scientific; learners should do all the questions and not concentrate on one only.

6.9 CONCLUDING COMMENTS

Responses by all the learners from the three schools that I interviewed led me to conclude that the learners had a somewhat different, yet most enjoyable year in their Grade 10 Biology class with its introduction of cooperative learning as a teaching method. Learners no longer felt afraid to ask questions. They were normally reluctant to do this in the traditional class. They liked helping each other and sharing ideas which was fostered with the cooperative approach.

Learners often feel that when they ask the teacher questions in the traditional method, the teacher would feel that they are wasting his time. Further they have no time to say anything as the teacher is always busy teaching. The lack of interaction causes learners to become bored and to then feel that the lesson is uninteresting. This in turn often causes their mind to wander and to think about other things.

A major difference between the two teaching methods that had learners excited about cooperative learning was the fact that they were now fully involved with their learning experience. They were extremely busy with preparing and discussing. They no longer felt bored or sleepy in class. They were now able to openly and freely share their own points of view with little chance of being ridiculed in front of the whole class. Because the information had been largely generated by themselves, they no longer found the lessons to be tedious or uninteresting.

The concept of sharing within the group resulted in several other different advantages for the learner. Learners got to know each other much better, they communicated more freely, and in general were more relaxed. They developed confidence in themselves that allowed them to feel better about their work as well. In probing the reasons for their improved confidence, learners offered the following possibilities: “I looked up answers and prepared myself for discussion”, “I became very confident in Biology, I am scared to ask questions in other subjects”, “We were scared to speak to the teacher, but with cooperative learning it changed”.

I asked learners if they liked working in groups because it possibly gave them a chance to discuss their own personal matters. I was told that this did not really happen much because they had a lot of work to do and that if they fell behind, it was not easy to catch up. The urge to deviate certainly was there, but they tried to encourage each other to stay focussed. Another learner stated that the teacher was quite strict and came around to check on them at regular intervals enquiring what they were busy with. I could see that learners did to a small extent discuss their own matters, but it was generally done when they had completed their work, or they ensured that their work was done as well. It was reported that in comparison to the traditional lessons where learners waited for the bell to ring in order to end a lesson, in the cooperative lessons, learners wanted to complete their given work in that particular period and were less inclined to waste time.

Learners had indicated to me that they encouraged those who did not want to work or lost concentration in the groups. Some learners even took offence and chastised others for depriving them in the group when they did not cooperate.

I asked learners to tell me about things they disliked about cooperative learning. Most of the responses showed that learners generally did not like that which inhibited the learning process. Things such as laziness, playfulness, absenteeism and lack of cooperation were mentioned. A learner also indicated that sometimes

someone was not in the mood to speak and this created a problem as cooperative learning demanded being active in the group. I did however note that at a later stage when I asked learners how they thought we could improve on cooperative learning, not many of these problem areas were mentioned. Someone did state that lazy learners would need attention.

Learners had repeatedly indicated that their understanding had improved with cooperative work. I questioned them about this to try and understand what it was that helped them to understand. Some felt that it was because they had done the work on their own. It was different from the traditional method where an attempt was being made to transfer knowledge to them. Often with the traditional method, learners neglected to do their homework. This was in contrast to the cooperative method where learners did their work so as not to let themselves or their groups down. As one learner put it, “you have to prepare as you cannot just go and discuss without preparing”. This in turn made learners I believe feel that the work was easier than it really was and was also a motivating factor for them.

All the learners who were interviewed do not wish to continue with their learning in the traditional manner alone. Some feel that cooperative learning was by far the best experience that they’ve had. They found it both interesting and stimulating. Learners in general would like to continue with cooperative learning and many would like it to be extended to other subjects as well.

As a teacher, I found the actual experience of how learners had reacted to the cooperative method to be very encouraging. Learners in general, especially at secondary school level have over the years become very complacent. Learners hardly ever raise their hands in class to offer a response and most times we teachers struggle to get them to offer comments or suggestions. The cooperative method had in a way re-activated the learners. Learners were beginning to take charge of their learning. The classroom was being transformed in such a positive way as learners were no longer prepared to be passive recipients of information. I was further impressed by the fact that learners were conscious of their renewed

vigour to learn and to make a success of their studies.

CHAPTER SEVEN

EMERGING THEMES

If one of the most prominent heresies of educational change is the culture of individualism, then collaboration and collegiality are pivotal to the orthodoxies of change. Collaboration and collegiality have been presented as having many virtues. They have for instance, been advanced as particularly fruitful strategies for fostering teacher development. Collaboration and collegiality, it is argued, take teacher development beyond personal, idiosyncratic reflection, or dependence on outside experts, to a point where teachers can learn from each other, sharing and developing their expertise together (Andy Hargreaves, 1994:186).

7.1 INTRODUCTION

During this research project, several issues constantly played themselves out and are discussed here as themes that have emerged from the research. There were pronounced changes in terms of relationships between teacher and learner, and learner and learner. There were both positive outcomes and problem areas. There were concerns for us teachers, especially the time-factor. Finally, there was also constant development and growth for us as teachers and researchers.

7.2 THE DEVELOPMENT OF RELATIONSHIPS IN THE CLASSROOM

During group work, the organization of the classroom is vastly different from the structure of the classroom in whole-class or individualised instruction. This structural change in classroom organization necessitates changes in its management and redefinitions of the traditional roles of teacher and student (Lotan and Whitcomb, 1998). The new roles assumed by teachers and learners In our classrooms evolved into new and different teacher-learner and learner-

learner relationships. Different from that of the traditional classroom and new in terms of our previous experiences with our learners.

7.2.1 Teacher-Learner Relationship

It was our experience that the cooperative structured classroom had created a learning environment that greatly influenced a new kind of relationship between teachers and learners. For most of their school life, our learners had been taught in the traditional way. They picked up and accepted the subtle messages that indicated the teacher to be the sole provider of information with them being the passive recipients of this information. Those learners who are not good at regurgitating information generally do not enjoy being called upon to answer questions or make contributions when requested to do so by the teacher. These learners indicated that they were scared of the teacher, a possible reason being that they were often chastised for not knowing the work. Further, these learners are often ridiculed by other learners when they find themselves in this situation.

The teacher's role changes dramatically with group work. The teacher is no longer a direct supervisor of learners demanding work to be done as directed. The teacher no longer has the responsibility of watching for every mistake with the aim of correcting it on the spot. With group work, authority is delegated to learners and to groups of learners. They are in charge of insuring that the work gets done and that classmates get the help they need. They are empowered to make mistakes and to find out what went wrong and what might be done about it (Cohen, 1994). Redefining the traditional role does not come easy for many teachers. Some struggle with no longer being "the centre of the steadily revolving wheel" (Lotan and Whitcomb, 1998). This 'letting go' as Cohen (1994) puts it did not come easy for us teachers as well. There were times when we were unsure if the new way would improve the learning process. It must be remembered that for a long time, we teachers determined how and what was learned in our classes. Allowing learners to take charge of their own learning and in this way empowering them seemed at the same time to disempower us teachers.

Our new role was well received by most of the learners and led to an improved teacher-learner relationship. Our learners no longer saw us as the only providers of information. We teachers, when directly involved with the learners in their groups also played a new role. More often than not we would be listening rather than talking. This stance in itself was far less threatening to the learner. Learners thus reported that they were no longer scared of us, their teachers. Learners seemed to like being allowed to work on their own in their groups unhindered by us teachers. They also liked knowing that we were there to help out when they needed help. There were a small number of learners at one particular school that felt that the teacher was now dumping all the work on them and that it was not right as it was the teacher's responsibility to teach. This type of reaction was to be expected as the new demands on the learners were enormous. It's understandable that some would feel uneasy as they had to change quickly from passive recipients to active participants in the classroom.

Because we teachers began to spend less time rushing through a lesson presentation and more time on observing and listening to our learners, we began to see our learners in a new light. We began to learn so much more about them. As our interaction with our learners increased, so too did our confidence in them. Cohen (1994) states that teachers are always surprised to discover how smoothly learners can operate on their own. Schmuck (1997) reminds teachers that students have the information that they need to reflect on their teaching and to plan for change in classroom procedures.

7.2.2 Learner-Learner Relationship

The relationships that formed amongst our learners in their cooperative groups was a major contributor to the success of cooperative learning as a teaching method. In general, our experience in the classroom had shown that learners very often communicate with each other whenever they have an opportunity to do so, or when they have been given an assignment or homework to complete. Placing

learners together in groups where it was now acceptable or allowed to communicate with each other about the work was therefore well received by them. It should be remembered that in the past, asking for help or assisting classmates was often considered “cheating”, and heavily penalized (Lotan and Whitcomb, 1998). The absence of resistance to the new class arrangement was in itself a positive step that facilitated the learning process.

One of the key aspects of cooperative learning is positive interdependence amongst group members. Our initial use of the Jigsaw II method with its expert groups demanded that learners work together in a manner that fostered interdependence. This type of arrangement within the group encouraged group cohesiveness. Learners felt needed. They knew that other members depended upon them for a part of the work. As reported in the interviews and questionnaires, learners felt that they did not want to let the rest of the group down and therefore tried their best to contribute to the group. Learners also in general wanted to be accepted by the group and did not want to be accused of letting the group down. The group in turn began to acknowledge that they needed each other to succeed. This led to group members acceptance of each other as valuable members of the team.

The closer working relationship within the group developed at times into something more significant. Learners began to get to know each other much better. The discussions that took place allowed some learners who were not previously well known to others in the group, to expose their talents, characteristics, weaknesses and so on. Learners reported that they began to see their group mates in a new light. Their preconceived assumptions about classmates were often incorrect. Many new friendships were forged as learners began to socialise with some of their group mates outside the class as well.

As learners began accepting each other, they began to feel safe within the group. They began to communicate freely with each other without fear of being intimidated or ridiculed. This is extremely positive from a learning point of view for

the learner. In the traditional lesson, learners often do not venture to divulge their opinions or views for fear of being ridiculed. They tend to be on the outside of the learning process in the class which leads me to feel that they are not actively engaging the learning material. I therefore find it to be positive and encouraging when learners are discussing, debating and questioning in the groups. Our learners clearly stated that they preferred asking each other for support or help within the group. They further had no fear of asking each other repeatedly until they thought they understood the work. This is a major shift from the traditional method where learners do not generally ask the teacher to explain more than one time for fear of being labelled stupid by the teacher or rest of the class. This often resulted in some of the learners not understanding the work being taught and led to learners having to ask each other after the lesson for help. For some, copying the work from a classmate was an alternative used to avoid being chastised by the teacher.

As learners, especially the weaker ones, began to enjoy success in terms of being needed by group mates as well as having a better understanding of the work, their self confidence improved. Learners began to stay focussed on their work. They encouraged each other and strived to succeed. There was no time generally for idle chat. The urge for idle chat seemed to disappear as learners were in discussion for most of the lesson. Learners were far more active and this was possibly the reason for them indicating that cooperative lessons did not bore them. This again was a change from the traditional lessons where they often reported feeling sleepy in the class.

7.3 POSITIVE EFFECTS OF COOPERATIVE LEARNING FOR

LEARNERS

7.3.1 Accountability

Individual accountability is making each member accountable for his or her own learning or contribution (Kagan and Kagan,1994). Our classroom observations led us to conclude that our learners became progressively more accountable with regard to their work in their cooperative groups. During our first cycle, the usage of the Jigsaw II method required and encouraged positive interdependence among the group members. Although there were initial problems with some learners regarding laziness and/or poor behaviour, with time this greatly diminished. With our second cycle, we no longer used the expert groups of the jigsaw method. This change which no longer had the element of a kind of forced interdependence did not in fact result in less positive interdependence. As learners became used to the cooperative method, they became more responsible or accountable. This was displayed in various actions by the learners. Learners were working at home, preparing themselves for discussion and active participation in their groups. Kagan and Kagan (1994) state that when it is made clear to the students that they are being held accountable, it increases the likelihood that they will listen and participate. When certain members did not contribute or do their share, they were called to account by fellow group members. Learners became more serious about their work as they did not wish to let themselves or their groups down. Learners during their interviews also made this point clear when they stated that they were depending upon each other in the groups. Johnson and Johnson (1992) note that participants in a cooperative situation share responsibility and that each member is expected to contribute his or her efforts to accomplish the group's goals and to make other members do likewise. It was our experience too that learners who were normally lazy were forced to become more active as they could not 'hide' in the group. They had to be active in the discussions. Irresponsible behaviour was not tolerated and was seen in a bad light by other group members especially when it disrupted work in the group. Johnson and Johnson (1994) state it is important that members know

that they cannot “hitchhike” on the work of others. The purpose of cooperative learning groups is to make each member a stronger individual in his or her own right.

For us in the team, it was very encouraging to observe that our learners were acting in a responsible manner with regard to their work. The use of cooperative learning was a shift to a teaching method that was learner or group centred as compared to teacher centred. I believe that if our learners did not respond in such a responsible manner, we teachers would not have been morally able to continue with the use of cooperative learning because the learning experience in our classes would have been seriously compromised. Brilhart and Galanes (1989) contend that the ideal set of constructive attitudes which promote effective group work is summarized in the phrase ‘a sense of responsibility for the success of the group’.

7.3.2 Self Esteem

Slavin (1983) asserts that the most important psychological outcome of cooperative learning methods is their effect on student self esteem. For him, the value of increasing student achievement is a concrete demonstration to the student that he or she can learn and is as important as the achievement itself. Slavin (1983) contends that students’ beliefs that they are valuable and important individuals are of critical importance for their ability to withstand the disappointments of life, to be confident decision makers, and ultimately to be happy and productive individuals.

It was our experience in this research that our learners had over the year continually developed greater self esteem. The learners themselves, when questioned about this in the interview and questionnaire, felt that they had greatly improved in terms of self esteem. Learners were confident about their ability to work on their own in their groups. They felt that they were able to get on with the learning experience on their own: that is, without the constant assistance of the

teacher. Our learners largely enjoyed taking on this new responsibility.

This process did not just happen overnight. As learners got used to working in their groups where they were requested to play an active role, and as they began to see that they were making a meaningful contribution to their group, their confidence began to grow as well. Learners began to see that they too could do the work. It must be remembered that learners had for a long time solely depended on the teacher for all the information with regard to their learning. With traditional teaching, very few learners are called upon by the teacher to say or do something during each lesson. This in turn creates little opportunity for learners to demonstrate what they know. Also, learners want to be accepted and liked by other class members. This is generally facilitated by learners displaying that they know or understand the work being done in class. Achievement and peer acceptance plays a vital role in building self esteem.

Lazarowitz and Karsenty (1990) in a cooperative learning study with tenth grade Biology students ascribed the gains of learner self esteem to achievement and improved social relations among students. Their study supported Bloom's (1975) assumptions that success and achievement are strongly linked to self esteem.

Lazarowitz and Karsenty (1990) further state that a cooperative learning method, namely, small-group instruction encouraged cooperation and mutual help, which in turn had an impact on students' relations. Here, every student in the small-group instruction was responsible for a small part of the learning material and had to teach it to other members of the group. The feeling of having a specific responsible role enhanced students' self esteem. According to Allen (1976), students go through cognitive and behaviour changes when assuming the role of teachers. These changes are very positive in the high school student population. Our learners too reported that the opportunity afforded them in the cooperative lessons to assume the role of teacher had motivated them to do well in the group. This in turn had the effect that they were seen as valuable members of the team. Gawe (1996) supports this view by stating that it is possible for learners to develop

high self esteem if they know that their opinions and ideas are as valuable as everybody else's in the group. It was our experience that greater acceptance by the group contributed to an improved self esteem for the learner.

It was extremely encouraging for us teachers in this research project to observe that our learners were continually improving in terms of self esteem. The improvements easily noted, are those that are made by those learners who were generally shy or reluctant to actively partake in class activities. It was our experience that the gains made by learners in terms of self esteem during cooperative lessons were now being used in times of traditional lessons too. This meant that learners were now more active and confident during traditional lessons. It was encouraging for us to note that learners were able to transfer their self confidence to other situations, such as the traditional lessons, which does not offer the same safety of the group situation. Slavin's (1983) view that improved self esteem prepares one to withstand disappointments certainly accounts for learners who were now willing to expose themselves to the often harsh criticisms of classmates during traditional lessons.

7.3.3 Understanding

Improved understanding was a common response from many of our learners when they were asked to reflect on their cooperative learning experiences. Over 85% of the learners who returned the questionnaire indicated that cooperative learning had helped them in understanding the work. This view was further supported during the learner interviews.

It is my view that our learners used the word "understanding" to indicate more than the recalling or application of information. To me, learners first of all used the term to indicate that they followed or understood what they were being asked to do, that is, the task to be completed was clear to them. Sometimes, in the traditional classroom, learners do not follow the work instructions given by the teacher, especially if they are not given in writing. This is because they are not

fully attending to the instructions given and also because they generally only focus on the instructions when they get down to actually doing the work, which could sometimes be later at home or even the next day. Learners seldom ask teachers to repeat the instructions and then claim that they do not understand the work when they in fact did not know what to do. In the cooperative lesson structure, learners feel less threatened to ask their group mates to repeatedly, if necessary, explain what needs to be done. A likely outcome here would be that they would then know what to do and thus feel that they understand the work. It would be reasonable to assume that if learners do not know what they have to do, they would find difficulty in completing the task. This could then result in them feeling that they do not understand the work In contrast to this, once learners understand the task at hand, their chances of completing their assigned work will be much better. The available help and/or support within the group plays a role in this regard.

According to Bennett and Dunne (1995), what children learn in the classroom will depend to a large extent on what they already know. Mercer (1995) concurs by stating that education at the classroom level proceeds by the development of shared understanding. Through talk and joint action, participants in the process of teaching and learning can build a body of common knowledge which provides a contextual basis for further educational activity. Bruner (1986) who was influenced by the work of Vygotsky stresses the importance of the social setting in learning. He states that most learning in most settings is a communal activity. The child must make his knowledge his own in a community of those who share his sense of belonging to a culture. For Vygotsky (1978) learning is said to awaken a variety of internal developmental processes that are able to operate only when the child is interacting with people in his environment and in cooperation with his peers. Social interaction is thus assigned a central role in facilitating learning. The child's potential for learning is revealed and often realised through his interactions with more knowledgeable others who could be anybody such as peers, siblings, the teacher and so on.

7.3.4 Development of Self Discipline

Cooperative learning encouraged and fostered self discipline in our learners. This became evident when our learners began to take charge of their own and their group's learning. Once our learners were given their work assignments, they were able to proceed fairly independently of us teachers. Learners no longer saw us teachers as the only providers of knowledge or information in the class. They were able to look up answers and express their own viewpoints with far greater ease than in the past. Being able to complete tasks on their own gave learners a great sense of satisfaction. It made them feel proud of their achievements and often they would want to show us teachers and the class in general what they had accomplished. This was displayed by their eagerness to show us what they had done when we checked on the groups. Learners, in cooperative groups, just as with traditional teaching, like being praised for work well done.

The above situation was not experienced from the onset of the introduction to cooperative learning. Various factors played a role in the development of our learner's new found independence. Firstly, learners had to accept the group structure in which their learning would take place. They had to develop a trust in each other that would provide them with safety in the group. The group should not be a place where they are ridiculed, but rather a place where each one plays an important part in the group's success. Once learners acknowledged that they were equal or important members of the group, they began playing a meaningful role. This meaningful role included that learners took responsibility for their share of the work and they encouraged each other to make a positive contribution. One learner stated it quite clearly in the interview when he said that learners should not expect to get answers from other group members only, but that they should come to the group ready to make their contribution as well. This attitude developed over time as learners began to see that the group's success depended on each one contributing.

Cooperative learning demanded much more from the learners than did traditional

teaching. With cooperative learning learners were given work to prepare at home on a daily basis for discussion in class. This translated into learners having to be active both at home and in the classroom. The time spent on engaging the learning materials was far more than in the traditional lesson where learners largely sat back while the teacher did nearly all the work. In spite of the much greater demands placed on our learners in the cooperative method, they still largely preferred and enjoyed this method. The groups tried very hard to keep up to date as any work left undone would simply have to be done together with the new work. Falling behind did not mean that the work would disappear.

It would seem that the success learners achieved through their efforts and understanding in the cooperative method played a major role in inculcating a sense of responsibility and self discipline in the learners. To a large extent, I think learners were prepared to make the extra sacrifices as they could see that their efforts were being rewarded. On the one hand they had a better grasp of the work being done and on the other they felt a sense of worth in being able to contribute to their group's success.

7.4 LEARNER BEHAVIOUR THAT INHIBITS LEARNING IN THE COOPERATIVE CLASSROOM

Our experiences with cooperative learning has shown that the learning process is severely inhibited when certain behaviours are displayed by learners. During this research at least one member of the research team had experienced the following learner actions to hinder the cooperative learning process:

7.4.1 Excessive Noise

During our first action cycle some of us experienced our classes to be too noisy to an extent that we were concerned that it would retard the learning process in our classes as well as disturb teachers in neighbouring classes. During our reflective session we put this down to learners being over enthusiastic. Our learners in

general have for their entire past learning experiences been exposed to traditional teaching where they were largely passive recipients of information. Learners by their nature want to talk and the cooperative class arrangements gave them an opportunity to do so. It was therefore not surprising that they acted in the way that they did. This type of learning was new to them and we were sure that the learners were not really aware of the amount of noise they were generating.

One of the teachers too felt uneasy about the noise from her class disturbing neighbouring classes. We felt that it was important for teachers of these neighbouring classes to know what we were doing in our classes and that they needed to feel free to inform us when the noise disturbed them. This was important as we acknowledged that getting the noise down to an acceptable level would be a process in itself. For us the research team, this problem would receive attention within the action research framework and therefore would need time to overcome. It is also important to note that the cooperative class is not a silent one where only the teacher's voice is heard. During the cooperative learning period, one could expect at any time that as many people as there are groups to be in discussion with group mates. When this takes place, even in an 'orderly' manner, the amount of noise generated will be much higher than for traditional lessons.

Within the action research framework, we put in place certain agreed upon mechanisms to deal with this problem. Firstly, learners needed to understand what an acceptable noise level meant as well as the reasons for wanting this. We would constantly remind learners when the noise level became excessive. We were also conscious of not trying to stifle communication in the group. At times we would even call on the entire class to stop working so that learners could re-focus on the task at hand in a calm manner. We also enlisted the help of a member in each group on a rotational basis, whose task it was to keep the noise level of that particular group at an acceptable level. The problem of excessive noise vastly improved over time. As learners became more accustomed to the new way of working, taking note that they were being allowed to 'talk' in class, they began to settle down to the task at hand.

7.4.2 Laziness, Fooling Around

During our first action cycle, we used the Jigsaw II method. Learners were given the task of working out and learning a section of the work for discussion in expert groups and later with their cooperative group. In the second cycle we did away with the expert groups and learners had to prepare all sections of the unit for discussion in their groups. Over both cycles, we experienced that some learners did not do or complete the prescribed work. This caused a problem in the group as the learner could not then actively take part in the group discussions. This then placed a greater amount of work on the shoulders of the other group members. According to Kerr and Bruun (1983), less able members sometimes expend decreasing amounts of effort and leave the work to other members creating a 'free rider effect'. It is also stated that group efforts can be characterized by self-induced helplessness (Langer and Benevento, 1978) to diffusion of responsibility and social loafing (Latane, Williams and Harkins, 1979).

There are many ways that groups can function in unproductive ways. Group effectiveness does not magically appear when a group is formed. Members must consciously work to build and maintain the effectiveness of their group (Johnson and Johnson, 1991). It was our experience that some group members were unhappy with fellow group members when they did not do their work. In some cases the 'lazy' learners were told directly that they should not expect to get answers and that they should contribute to the group discussion. The calling of group members to account played a big role in solving the problem of learners not preparing for discussion. It would seem that learners do not want to be unpopular with their peers and that chastisement by peers was seen in a serious light.

As learners began to view their work in the cooperative groups as being serious and not just as an activity to keep them busy, they did not tolerate fooling around in the groups. They did not hesitate to call each other to account when it was necessary to do so. One of the learners during the interview session stated that

there was no time for fooling around as they wanted to complete their work assignment in that particular period if possible. Graves (1994) states that in one classroom a teacher was having difficulty because of the disruptive behaviour of two boys who considered themselves class cutups. While this behaviour had drawn favourable attention from other students in the past, it was no longer appreciated as students were working in interdependent teams and feeling a sense of accomplishment for their group work. Learners also saw that when they lagged with their work, it became increasingly difficult to catch up without having to make up at home for lost time.

7.4.3 Absenteeism

During the first action cycle when we still used expert groups, it became a huge problem when learners were absent. Learners who were present often felt let down by those who were absent. Absenteeism was one of the main things that learners disliked about working in groups as it put an extra burden on them. By the second cycle we did away with the expert groups and learners had to work out all the questions. This changed the scenario somewhat as learners no longer depended on each other for a specific section of the work, but they still depended on each other to present and discuss in the groups. Learners still felt let down when someone was absent. Sometimes we reconstituted groups before the lesson, but this generally wasted time. Learners in general who were regularly absent were not popular in that nobody wanted them in their groups.

Lasley ll and Matczynski (1997) state that the best solution to absenteeism is to find a way to attract learners to school, to entice them to want to be there. One teacher that they knew dealt with absenteeism in the Jigsaw II method as follows: On the first day the teacher teaches the information the students need to know. Students then read the material and are responsible for knowing the answers to all the questions. When the students return the second day, the teacher forms the groups based on who is in attendance. Students are then assigned a number for their expert groups, and they work in their groups to refine and extend their

understandings relative to a specific question. The students return to their "home" group for that day and teach their expert material.

Absenteeism is a phenomenon that occurs at all schools no matter the teaching method used. All three of the schools taking part in this research largely has learners from disadvantaged communities that experience many socio-economic problems. Generally, within this environment absenteeism is a reality. In spite of all these difficulties, there were learners who indicated both in the interviews and questionnaires that they looked forward to the next lesson or school day. The cooperative method had inspired some learners to be at school.

7.5 THE TIME FACTOR: A CONCERN FOR TEACHERS

A recurring problem in each of our four action cycles was the amount of time needed to complete a lesson unit using the cooperative learning method. The amount of time needed for a lesson unit in cooperative learning was more than double for a traditional lesson. In cooperative learning, learners needed to work out answers to questions for discussion in their groups. This was then followed by the actual discussion in the groups. The pace of discussion was largely dictated by the learners and differed from group to group. The teacher did not have direct control over how long each unit would be discussed.

For us teachers, the completion of the syllabus is always a concern. Even when using the traditional method alone, the completion of the syllabus can sometimes be difficult especially if there are disruptions to the normal teaching programme. Because our schools still largely use examinations to promote learners, we teachers are always under pressure to complete enough new work on which these examinations can be based. It became clear that progress was far slower in terms of the amount of work covered when using the cooperative method. This situation frustrated one of the teachers in this research project. I think that it is important to note that often the non completion of the syllabus would seem to indicate that the teacher at the very least was inconsistent with his or her work.

Davidoff and van den Berg (1990) state that often the greatest obstacle to our even thinking of trying anything new in our classrooms is the threat of the ever-present examinations. According to them, countless comments by teachers after doing something innovative and more creative than their traditional lessons in class sounded as follows:

> It's all very well doing something like this - the students enjoyed the change and so did I. But it's too time-consuming - if I had to run my classes like this all the time, I'd never get through the syllabus, and the students wouldn't be adequately prepared to write exams. There's so much work to cover, and I simply have to get through it all.
> (Davidoff and van den Berg, 1990:)

While the above quotation sounds very familiar to our own experience, we teachers did acknowledge the value that cooperative learning held for our learners. We tried to come up with ways in which we could strike a balance between continuing with the use of cooperative learning and completing a fair amount of the syllabus. It was obvious that we would not be able to complete the entire syllabus if we only used the cooperative learning method. Our solution to this dilemma was to continue with cooperative learning but to decrease its frequency. The variation in the lesson styles did seem more acceptable to our learners as well. Davidoff and van den Berg (1990) do however feel that if students find the work itself interesting, engaging and relevant, then the motivation would come from the students' responses to their work, rather than through the fear of failure.

I think it is important to mention here that it is hoped that this research would find acceptance by other teachers as well. The problem of time and the completion of the syllabus would in my view be a stumbling block to its acceptance. It was therefore important to try and find a way of dealing with it. The issue regarding examinations as an all-important part of the learning process will have to be further debated as well.

7.6 THE NEED TO VARY TEACHING METHODS

There is a need to vary teaching methods. During the early stages of this research, we taught a whole chapter at a time using the cooperative learning method. This was then followed by a whole chapter being taught in the traditional manner. Because the cooperative method demanded much more participation and involvement from the learner, an imbalance was created as learners had a lot to do during cooperative lessons and very little work when the traditional method was used. This is so because during traditional lessons, we teachers largely do most of the talking and even writing in the form of a chalkboard summary. Learners are expected to be paying attention and to possibly copy the summary into their workbooks. It therefore seemed logical to alternate between both teaching methods in a specific chapter or even in a lesson unit. Feedback from our learners too, in the early stages indicated that learners tired or lost interest in the subject matter when the same routine, that is cooperative work or traditional lessons, was used over a long period. We therefore tried to identify those lessons that seemed better suited for discussion and assigned them to be taught in the cooperative learning manner. This arrangement of alternating with the teaching styles did find greater acceptance with our learners. It also saved a lot of time as some lessons were more easily taught in the traditional manner and much more work could be covered in a period. This also addresses the concern of covering enough work in the syllabus.

In every classroom, instructional activities are aimed at accomplishing goals and are conducted under a goal structure. According to Johnson and Johnson (1994), an essential skill needed by all teachers would be for them to know how and when to structure students' learning goals as cooperative, competitive or individualistic. For them, each of these goal structures has its place and would be appropriately used in the ideal classroom. Further, it is important for teachers to be able to match a goal structure with a learning activity in order to improve teaching effectiveness.

The traditional view of classroom activity which assigns the learners the role of passive recipients of facts, and the teacher the presenter of factual knowledge has been criticised by many educational theorists. According to Vakalisa (1996), the success of the teaching-learning activity stands or falls by the teacher's ingenuity (or lack of it) in creating a classroom climate that is conducive to active participative learning by the student.

Hertz-Lazarowitz (1992) state that teachers experience a dramatic change in role definition when they first shift their instructional style from traditional teaching to a more interactive and cooperative mode of instruction. The teacher's role has to be recast from taking charge of teaching to taking charge of learning. The teacher thus has to relinquish their role as expositors of content to become facilitators of the acquisition of knowledge by teaching their students how to become active and interactive learners. Cohen (1994) also warns that the teacher has to let go of the student in group work. In group work, the students are in charge of insuring that the job gets done, and that classmates get the help they need. Learners are thus empowered to make mistakes, to find out what went wrong, and what might be done about it.

As a teacher, I think that it might be difficult for many teachers to be willing to experiment with other teaching methods especially when they have to make the shift from a position where they are in authority and control to one that empowers the learner to take charge of their own learning. This research has however shown that learners can gain a lot from other teaching methods such as cooperative learning. The challenge in my view is for teachers to find a workable balance for themselves and their learners in terms of the goal structure that they wish to use in their classrooms.

7.7 TEACHERS PROFESSIONAL DEVELOPMENT

This research project was the first formal reflective inquiry undertaken by me as well as the other team members. All of us, like our colleagues in general in the

teaching profession, do on a regular basis reflect and act on various everyday issues in our classrooms. These practices are done as part of our daily routine to improve or rectify issues affecting us or our learners. It takes the form of us perhaps reassigning a place to sit for a disruptive learner, paying more attention to a weak learner by offering alternative explanations to him, and so on.

A study such as this was very different for us in comparison to the minor adjustment that we made before in our classes. Spending fifteen months on planning and implementing this research has had a significant effect on us. We had now progressed from teachers to teacher-researchers. This was significant in that we were now trying to generate knowledge with regard to our practice of teaching for ourselves. For many years teachers like us, and many others were always considered users of information that had been generated in most cases by researchers, who were often removed from the actual classroom experience. We had in most cases come to believe and accept that information published in books was the only reliable and tested way of doing things in our classrooms. It was therefore encouraging for us to experience the changes taking place in our classes as a result of our own research. Schmuck (1997) states that traditional research is usually carried out by disinterested scientists, often with an excessive concern for objectivity and a wish to establish generalized truths. For him advocates of action research aim to close the social distance and culture gap between scientist and practitioner and to make research methods useful on a daily basis in the classroom and in the school.

Fogarty (1997) asks the following question: What makes more sense than teachers embracing the role of reflective practitioners and engaging in practical action research in their classrooms? She goes on to say that after all, they are the closest to the action in the classroom; they are the most informed about the intricacies of that action; and they, along with students are key stakeholders in any action in the classroom. Forgarty's comments that are so appropriate espouses a view long held by many teachers. The problem that we teachers experienced in acting on this held belief was the lack of knowing how to go about undertaking

such investigations. By and large, our own training as teachers did not prepare us for the possibility of being knowledge generators. Also, the average teacher today will tell you that they just do not have the time to do research. This is true in many cases as teachers have very high teaching loads and no time has been built in to accommodate serious reflection of their work. Schmuck (1997) concurs by stating that teachers find hope in what will facilitate their improvement but are sobered and challenged by obstacles to improvement.

Having undertaken this research has certainly contributed to our development as teachers. Action research has offered us new perspectives in our teaching practice. It has always been the case that experience is the best teacher. Our experience gained here makes it much easier to consider future research. We have also gained sufficient knowledge and confidence to share our findings with colleagues. This sharing will undoubtedly further add to our development as teachers. Knowledge or information with regard to our practice that has been generated by others will certainly not be viewed as the only possible options for implementation in our classes. For our team, the idea put forward by many action researchers that teachers are in the best position to improve on their own practice certainly holds true. The success we experienced with this research allowed us to draw that conclusion.

7.8 PROGRESSION WITHIN THE ACTION RESEARCH CYCLE

As a team, we had spent close on three months in preparing for the implementation of this action research project. We had agreed to completing four cycles. This evolved as I had wanted to spend at least one full academic year in developing a cooperative approach to teaching Biology to our Grade 10 learners. One year would allow us maximum time to spend with a particular class as a unit as learners would not in all likelihood progress together to the next grade. We had decided on four cycles because our school year is divided into four terms. The end of a term would therefore provide an ideal opportunity for reflection.

Patricia, Helen and I, were able to complete all four cycles as planned. We were able to do this as we largely worked together in terms of material preparation for the entire year. The fact that I was both researcher and facilitator helped in this regard as I was able to play a role in ensuring that everything needed in terms of materials were available for us to run the research. I was not looking in from the outside and expecting Patricia and Helen to do the work in class alone. As I was directly involved with my own classes, I could appreciate the challenges that needed to be overcome and could help facilitate the process better. The fact that Patricia and Helen were committed to seeing the project through also played a major role in our successfully completing all four cycles.

The progress that we made in term of the research in general and each cycle in particular showed constant development. We had started out as inexperienced researchers, relying heavily on the writings of researchers such as Cohen and Manion (1994), Margot Ely (1991), and others. In the initial stages, especially cycle one, where we relied heavily on information of researchers, it was not easy to transfer theory to practice. Dealing with so many new circumstances, such as large classes, group work, observing learners, recording, and being afraid of completely letting go of the learners, all contributed to feelings of being overwhelmed by this new undertaking.

One of the problems experienced in the early stages stemmed from our largely traditional teaching background. We would initially find ourselves constantly wanting to remedy any potential problems experienced in our classes immediately when it occurred. Having taken this action would mean that we did not spend time on reconnaissance before implementation. Stuart (1988) refers to this as mini-cycles rolling along inside bigger cycles. We did however record these problems experienced in our classes and at our determined reflective session, we discussed it and suggestions were made to try and counter such problems for the succeeding cycle. Over time, as we gained more confidence, we were more prepared to allow our learners to make mistakes without hastily trying to rescue them. One can say that we were growing or developing in terms of our new role

as researchers.

The second, third and fourth cycles proceeded much more smoothly. We noticed improvements in terms of our observations and were also encouraged at all times by the reactions and cooperation of our learners. Our reflective sessions played a role in uniting us in a way that was not common during our traditional teaching. The fact that we collaborated in terms of preparing materials and helped each other made things so much more easy and acceptable. The outcomes that we experienced in terms of the cooperative approach's implementation on our learners also played a role in our further commitment to continuing with the successive cycles.

It would be reasonable to conclude that we had progressed from being inexperienced, where we at times felt confused, to feeling much more satisfied with what we had done. We felt proud for having completed the entire four cycles as planned and for the success that was achieved in terms of developing a cooperative approach to be used as a teaching method for ourselves, and hopefully for other teachers in the future.

CHAPTER EIGHT
RECOMMENDATIONS AND LIMITATIONS

> ***... But we are used to being transmission teachers, and now it seems we have to learn new ways in which we can promote interactive learning, group work and project work. How, may we ask, does one engage the class in a dialogue or conversation in such a way that everybody has a chance to take part? How does one get groups working so that they become interdependent and co-operative, and so that the members of the groups support one another?***
>
> ***...Change is very difficult. That does not give us an excuse not to try, especially if we believe the change we are trying to bring about is necessary and will be of benefit to everybody***
> ***(Davidoff and van den Berg, 1990:27).***

8.1 INTRODUCTION

This chapter looks at what has evolved out of this research project. Based on the findings, recommendations are made with regard to the applicability and use of cooperative learning as a teaching method. Limiting factors in this project are referred to and recommendations for future research are made. The implications of this study for education in general are then presented.

8.2 RECOMMENDATIONS

8.2.1 Prepare Thoroughly as Teacher

We found that adequate teacher preparation on various levels to be central to the success of this kind of research. Teachers need to prepare for their 'new' role as researchers, especially when they are novices in this area. The demands and

procedure of researcher are largely different to that of teacher. One area in which this was evident was when learners made mistakes. The normal reaction of a teacher would be to rush in and rectify the problem. As researcher, the teacher should allow the process to develop on its own without controlling the situation. The new role demands that the teacher now observes the process as it unfolds and to collect data accordingly. This does not mean that the learners are simply left on their own and that the teacher is no longer responsible for the learning process. The difference is in the approach to teaching. Learners are given the chance to take charge of their own learning with the teacher playing the role of facilitator. This therefore does mean that the learners should be allowed to make mistakes and to also be given the opportunity to rectify them. A summary at the end of a lesson unit provided or facilitated by the teacher will afford learners the opportunity to check and correct their work where necessary.

The data collection process is another area that can be challenging. Many of the data collection techniques often appear to be easier than they actually are for the new researcher. Teachers should practice these techniques beforehand so that they are familiar with them during actual data collection sessions. It is not possible to replay what has transpired in the classroom, so data needs to be collected accurately the first time round. At the same time, it is important to accept that the teacher will not be able to listen to every comment being made in the classroom.

We also found that it is important for the teacher to remember that the research process is developmental in nature for the learners and the teacher. Many situations are often not predicted or anticipated beforehand. It is therefore important for the teacher to have an open mind and to be thoroughly prepared to take charge of these developments. When researching a particular issue, the teacher should also be forewarned that the result may be contrary to what was expected or desired. This result must then be accepted for this situation.

Working in a collaborative team has advantages for the teacher. Being able to

reflect on a plan of action that had been implemented as a team often results in a variety of views and opinions. The sharing and discussion also serves to reassure and encourage the teacher. Where collaborative teams are not possible, I would suggest that an interested colleague with whom ideas can be exchanged be approached.

8.2.2 Get Support of Management and Colleagues

In this study, we found that it is important to get the support of colleagues and management staff. The cooperative method differs substantially in terms of classroom arrangements from traditional classrooms. The teacher in the cooperative classroom no longer stands in front of the classroom in a lecture-style manner. This needs to be explained to colleagues, especially management so that they do not begin to think that the teacher is not engaging learners in a positive manner. Also, we initially found the noise level in the cooperative class to be much higher than was usual for the traditional class. Management members should be made aware of this so that embarrassment or misunderstandings are prevented. Teachers in the neighbouring classrooms should be invited to let the teacher know when the noise level becomes a problem for them. This will prevent complaints being lodged.

Where classrooms are shared by different teachers, the spatial arrangements should be discussed so as to avoid problems with other teachers. If necessary, the learners can be taught to re-arrange the classroom in a short period of time without too much disruption.

8.2.3 Make Materials Available

While all the schools in our research followed the same syllabus, it was found that we did not all use the same textbook. It is not always easy for learners to find the relevant information in their specific textbook, so it is essential that additional information and resources are made available where they are lacking. Also, not

all schools have resources such as duplicating facilities, etc. available as needed. It is recommended that such expenses are budgeted for as part of the research project.

8.2.4 Prepare Learners for the Social Challenges of Cooperative Learning

One of the most important aspects that should not be neglected is to prepare the learners for cooperative work situations. It has been our experience in this research, as well as the advise of many researchers such as Cohen (1994) that a suitable training programme be instituted to teach learners the group skills that they will require. To assume that learners will know how to work with each other in a constructive collegial fashion will be a mistake. Many of the initial problems that we encountered with the learner's behaviour was the direct result of inadequate preparation with regard to group skills. The pressure of wanting to cover syllabus is often great and the temptation to not want to take time to prepare the learners will only result in more time being lost at a later stage due to groups being disorganised.

8.2.5 Rethink the Importance of Syllabus Completion

It was our experience that cooperative learning needs more time per lesson unit than does traditional teaching. It is strongly recommended that the teacher decides beforehand if covering a little less of the syllabus would be acceptable. Our experience has shown that it is certainly worthwhile to cover a little less of the syllabus in favour of a result that displayed a stimulation or motivation by the learner towards his new learning experience. The new skills learned during cooperative learning is positive substitute for any work that may not have been covered. The teacher who tries to complete the syllabus, which is largely designed for traditional teaching, while employing cooperative learning techniques will be under enormous pressure. This situation is certainly not ideal to be trying out a new teaching method.

We would also suggest that this decision be taken in consultation with the subject head so that the necessary support can be given.

8.2.6 Listen to your Learners

Learners play a pivotal role in cooperative learning. It is strongly recommended that teachers take careful note of the views and opinions of their learners as to what works well and what does not. This should be done at regular intervals and can form part of the data used to make amendments for the successive action cycle.

Our learners had indicated that they preferred a combination of cooperative learning and traditional teaching lesson structures within a particular chapter being taught. This suggestion is endorsed by researchers such as Johnson and Johnson who advocate that not all learning be done in the cooperative method as different goal structures are needed for different outcomes. It is therefore also our recommendation that teachers use the cooperative learning method in conjunction with other teaching methods

8.3 LIMITATIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

The research done in this project was directed at developing a cooperative approach to teaching Biology to Grade 10 learners. Many of the topics that were covered dealt with specific information. Most questions were answered from information in the textbook or other sources. This would be very different from perhaps a language where many of the topics would be open-ended, or other subjects such as life skills where learners' views and opinions play a major role in the lesson. The open-ended questions allow for much more debate or discussion within the group as compared to a learner's giving a specific fact with an explanation for it. It is therefore possible that the type of interaction within the

group could be different for other types of subject matter.

Grade 10 learners are in the first year of the senior secondary phase. These learners have just crossed the barrier from the junior secondary where far less independence was expected of them. Cooperative learning expects them to work fairly independently and this transition might require far more preparation time than they had in this project. This once again refers to adequate preparation for cooperative learning. Prior experience with cooperative learning in previous grades would influence the pace and outcome of current learning. The results or conclusions of this study may not be completely generalizable to other grades.

Using a new teaching method such as cooperative learning in an examination subject where the completion of the syllabus is seen as all important tends to put the teacher on guard and is restricting. While we did allow for many things to evolve in a natural way within an action research framework, our continuous reduction of the amount of cooperative work was because of the completion of syllabus and the ever present threat of examinations. A different outcome might be possible where these restrictive factors are not present. It is also possible that some of the decisions taken by us as researchers were subconsciously affected by these factors.

Trying something out for the first time, when we were unsure of the outcome in terms of learner learning was also limiting. As teachers responsible for our learners progress in class, especially in terms of passing or failing the subject, I am inclined to think that running the same project for the second time may allow us to be more open-minded. This would be largely due to the fact that we are now sure that cooperative learning would benefit our learner's learning.

I also feel that we did not adequately prepare our learners for cooperative learning. Most proponents of cooperative learning such as Johnson and Johnson (1994) or of group work such as Cohen (1994), stress the importance of preparing learners for cooperation. The cooperative learning experience does not just

happen and the skills needed for it to happen, need to be learned. We implemented our first chapter of cooperative work from the first quarter of the year when conducting this research. This is possibly the reason for some of the problems that we experienced early on. While the action research methodology did allow us to address these problems, I do think that this research could have been affected by the lack of adequately preparing our learners for cooperation in the classroom.

Initially, we used the Jigsaw II framework to structure our cooperative class and to develop a cooperative learning method suitable for our teaching of Biology. There are several other well known cooperative learning procedures available that could have been used such as numbered heads together, co-op co-op, working in pairs and so on. It is possible that had we used another cooperative framework, the development of our cooperative method may have been different. The results are possibly unique to this investigation.

Our introduction of cooperative learning was certainly a novel idea at our schools for our learners. Over the year that we carried out our research, it emerged that our learners were in favour of a mixed approach with regard to our teaching. This then leaves us with the question of how our learners would have responded to the cooperative learning method if it had been used for more or all of their subjects at school. Further research is needed in this regard.

Similarly, when we undertook this research, Outcomes Based Education (OBE) was not as yet put forward as an integral part of schooling in South Africa by our National Education Department. I would therefore assume that if this same research was carried out now, many more teachers would be interested as cooperative learning is seen as pivotal to the OBE process.

All three schools that took part in this research project serve disadvantaged communities. The families are generally poor with many learners from single-parent backgrounds. Many learners live with a grandparent. This deprived

background contributes to many problems with the learners schooling. The accessibility and desire to engage with educational experiences such as newspapers, magazines, television, excursions and so on, outside school hours is severely limited. This scenario in general results in a learner who has limited general knowledge sitting in our classes. As already mentioned, the learning theory of social constructivism underpins cooperative learning. Our learners' prior knowledge was surely then a limiting factor in this research. It would be interesting to investigate the development of cooperative learning in more advantaged schools and communities. Although there were significant gains made at our schools, I would assume that even greater success would be forthcoming in more advantaged communities and schools where learners have greater access to a variety of information sources.

The disadvantaged background of our learners also contributed to high absentee rates. Many learners travel great distances to get to our schools and often the lack of funds for transport or other domestic factors contributes to this absenteeism. It would also be interesting to see what the outcomes of the introduction to cooperative learning would be in schools where absenteeism is not a problem. Future research could address this matter.

The possible spillover effect of cooperative learning on other subjects where traditional learning was still used was not investigated in this research project. It would be interesting to note if other teachers were being affected or influenced by learner's reactions in their classes due to the cooperative learning experiences that learners had in their Biology class. Further research could address this.

In terms of the methodology of this research, certain aspects are problematic. Firstly, the questionnaires were not returned by all the learners who were taught in the cooperative method in our classes. While the numbers were big enough to draw meaningful conclusions, it needs to be further investigated what the outcomes would be in terms of a bigger return by the learners. Similarly, only a relatively small group of learners were present for the follow-up interviews. For

this research, the questionnaires and follow-up interviews were used as a basis to determine how learners had perceived the cooperative learning method. It would be reasonable to assume that those learners who returned the questionnaires and who were present for the interviews were likely to have had a positive experience with cooperative learning. I did, however, find that the views expressed in the follow-up interviews were consistent with those expressed in the questionnaires. Learners were in my view honest with their responses as many had no difficulty in being critical or negative about cooperative learning when they felt it to be necessary.

In this research, we did not make use of outside observers. An action research relies heavily on observation when data is collected. My own role was one of researcher and facilitator. While I do not doubt that my own experience of researcher did contribute to the richness of the data collected, I do question whether outside observers of myself and the other team members could not have provided even more detailed or critical data. This is possibly a limitation that future research could address.

This research was driven by me largely because I was undertaking it for the completion of my studies towards a degree. This resulted in an unequal partnership in terms of the research team. It would be interesting to see how long such a project could be sustained if there were no outside motivation such as working towards a study requirement. Also, it would be interesting to see how such a study would progress if all the researchers had an equal stake in the research.

8.4 IMPLICATIONS OF THIS STUDY

In this study, with our collaborative effort, and through the methodology of action research, we were able to successfully develop a cooperative approach for the teaching of Biology to our Grade 10 learners.

I do believe that while this research was done to improve our own practice of teaching, the results obtained here could be achieved by other teachers as well. The results of this research indicate that cooperative learning as a teaching method can be used successfully to supplement the teacher's current teaching methods used in the classroom.

Our research indicated that learners preferred a mixed teaching method. Learners largely preferred being active participants in the lesson as compared to being passive recipients. A teacher has the option of alternating between using different teaching methods for separate lesson units or even using different teaching methods in the same lesson unit. Cooperative learning could easily be used by teachers to let learners further discuss certain topics after the teacher has introduced or taught a particular lesson.

It has been our experience that learners enjoy their learning much more when they are directly involved in the process of learning. This translates into greater motivation, enhanced self esteem, being more responsible and accountable for not only their own learning, but for that of their group as well. Learners begin to take charge of their own and each other's learning. For me, this is significant as school teachers have experienced a decline in a positive attitude towards learning by learners over the last few years. Cooperative learning can serve as a catalyst to reactivate learners and to generate a positive attitude towards learning.

LIST OF REFERENCES

Abrami, P., Chambers, B., Poulsen, C., De Simone, C., D' Appolonia, F., & Howden, J., (1995). *Classroom connections: Understanding and using cooperative learning*. Harcourt Brace:Toronto.

Adams, D., Carlson. H., & Hamm, M. (1990). *Cooperative learning and educational media: Collaborating with technology and each other.* Englewood Cliffs, New Jersey.

Allen, V. (Ed.). (1976). *Children as teachers: Theory and research in tutoring.* Academic Press: New York.

Allport, G. (1954). *The Nature Of Prejudice.* Reading, MA: Addison-Wesley.

Aronson, E., Blaney, N., Stephan, C.& Sikes, J., & Snapp, N. (1978). *The jigsaw classroom.* Beverly Hills, CA: Sage.

Augustine, D.K., Gruber, K.D., & Hanson, L.R. (1990). Cooperation Works! *Educational Leadership,* (Jan 1990), 4-7.

Bennett, N., & Dunne, E. (1995). Managing Groupwork. In Moon, B., & Mayes, A.S. (Eds.). *Teaching and learning in the secondary school.* Routledge: London.

Bloom, B.S. (1975). *Human characteristics and school learning:* John Wiley & Sons: New York.

Bot, M. (1999). A statistical overview of education. *Edusource Data News*, 29, 2.

Brause, R. & Mayher, J. (Eds.). (1991). *Search and research: What the teachers needs to know.* Falmer Press:London.

Brewer, M.B., Miller, N., & Edwards, K. (1985). Cooperative interaction in desegregated settings: A laboratory analogue. *Journal of Social Issues,* 41, 63-79.

Brilhart, J.K., & Galanes, G.J. (1989). *Effective Group Discussion* (6th ed.). Wm. C. Brown Publishers, Dubuque, Iowa.

Brombacher, A. (1994). Cooperative learning: Potential and Implications. *Stimulus,* 2 (3), 1-2.

Brown, L., Henry, C., Henry, J., & McTaggart, R. (1982). Action research: Notes on the national seminar. *Classroom Action Research Network Bulletin,* 5, 1-16.

Brubacher, M., Payne, R., & Rickett, K. (1990). *Perspectives on small group learning: Theory and Practice.* Oakville, Ontario: Rubicon.

Bruner, J.S. (1985). Vygotsky: A Historical and Conceptual Perspective. In Wertsch (ed.). *Culture, Communication, and Cognition: Vygotskian Perspectives.* Cambridge University Press: Cambridge.

Bruner, J. (1986). *Actual minds, possible worlds.* Cambridge, MA: Harvard University Press.

Carr, W., & Kemmis, S. (1986). *Becoming Critical: Education, Knowledge and Action Research.* Lewes: Falmer Press.

Coelho, E., Winer, L., & Winn-Bell Olsen, J. (1989). *All sides of the issue: Action research for cooperative jigsaw groups.* Alemany Press: California.

Chisholm, L. (1997). New policies and the challenge of budgetary constraints. *Wits EPU: volume 4, number 4.*

Chisholm, L. (1994). Policy and critique in South African educational research. *Transformation,* 3 (3), 149-160.

Cohen, G.E. (1994). *Designing Groupwork : Strategies for the heterogeneous classroom.* Teachers College Press, New York.

Cohen, L., & Manion, L. (1994). *Research methods in education* (4th ed.). London:Routledge.

Cooper, L., Johnson, D.W., Johnson, R., & Wilderson, R. (1980). The effects of cooperative, competitive and individualistic experiences on interpersonal attraction among heterogeneous peers. *The Journal of Social Psychology,* 111, 243-253.

Corey, S. (1953). *Action research to improve school practices.* New York: Columbia University Press.

Covington, M.V. (1992). *Making the Grade: A Self-Worth Perspective on Motivation and School Reform.* Cambridge University Press, Cambridge.

Covington, M.V. (1987). Achievement motivation, self-attributions and exceptionality. In Day, J.D., & Borkowski, J.G. (Eds.). *Intelligence and exceptionality.* Norwood, NJ:Ablex.

Covington, M.V. (1985). The role of self-processes in applied social psychology. *Journal of the Theory of Social Behaviour,* 15, 355-389.

Covington, M.V. (1984). *The motive for self-worth.* In Ames, R., & Ames, C. (Eds.). *Research on motivation in education* (vol. 1). New York: Academic Press.

Covington, M.V., & Beery, R.G. (1976). *Self-worth and school learning.* New York: Holt, Rinehart & Winston.

Cowie, H., & Rudduck, J. (1988). *Cooperative groupwork: An overview: Learning together - working together,* volume 1. London: BP Educational Service.

Davidoff, S., & van den Berg, O. (1990). *Changing your teaching: The challenge of the classroom.* Centaur Publications, Pietermaritzburg, South Africa.

Davidson, N., & Worsham, T. (Eds.). (1992). *Enhancing Thinking Through Cooperative Learning.* Teachers College Press: New York.

Deutsch, M. (1949). An experimental study of the effects of cooperation and competition upon group process. *Human Relations,* 2, 199-232.

DeVries, D., & Slavin, R. (1978). Teams-games-tournaments: A research review. *Journal of Research and Development in Education,* 12, 28-38.

Dewey, J. (1930). *Human nature and conduct: An introduction to social psychology.* New York:Modern library.

Elliot, J. (1991). *Action research for educational change.* Milton Keynes: Open University Press.

Elliot, J. (1989). 'Action-research and the emergence of teacher appraisal in the United Kingdom". Paper presented to the American Educational Research Association, San Francisco.

Elliot, J. & Whitehead, D. (1982). *Action research for professional development and the improvement of schooling.* Cambridge: Cambridge Institute of Education.

Ely, M. With Anzul, M., Friedman, T., Gardner, D., & McCormack Steinmetz, A. (1991). *Doing Qualitative Research: Circles Within Circles.* London: Falmer Press.

Fogarty, R. (1997). In Schmuck, R.A. (1997). *Practical Action Research for Change.* Skylight Training & Publishing, Inc. Arlington Heights, Illinois.

Gawe, N. (1996). Principles of Participative Teaching. In Jacobs, M., & Gawe, N. (Eds.). *Teaching-Learning Dynamics: A Participative approach.* Heinemann Higher & Further Education: Isando.

Granovetter, M. (1973). The strength of weak ties. *American Journal of Sociology,* 78, 1360-1380.

Graves, L.N. (1994). Creating a Community Context For Cooperative Learning. In Sharan, S. (Ed.). *Handbook of Cooperative Learning Methods.* Greenwood Press, Westport, CT.

Grundy, S., & Kemmis, S. (1981). Educational Action Research in Australia: The State of the Art (An Overview). *Paper presented at the Annual Meeting of the Australian Association for Research in Education, Adelaide.*

Guba, E., & Lincoln, Y. 1989. *Fourth Generation Evaluation*. Newbury Park:Sage.

Gultig, J. (1996). South Africa's new curriculum framework. In Lubisi, C., Wedekind, V., Parker, B., & Gultig, J. (Eds.). *Understanding outcomes-based education.* Pilot module of the SAIDE study of education project.

Hare, B. (1985). Stability and change in self-perception and achievement among black adolescents: A longitudinal study. *Journal of Black Psychology,* 11, 29-42.

Hargreaves, A. (1994). *Changing teachers, changing times: Teachers' work and culture in the postmodern age.* Cassell:London.

Hertz-Lazarowitz, R. (1992). Understanding Interactive Behaviours: Looking at six mirrors of the classroom. In Hertz-Lazarowitz, R., & Miller, N. (Eds.). *Interaction In Cooperative Groups: The theoretical Anatomy of Group Learning.* Press Syndicate of the University of Cambridge, Cambridge.

Jansen, J. (1999). Setting the scene: Historiographies of curriculum policy in South Africa. In Jansen, J., & Christie, P. (Eds.). *Changing curriculum studies on outcomes-based education in South Africa.* Juta:Kenwyn.

Johnson, D.W. & Johnson, F.P. (1997). *Joining Together: Group Theory and Group Skills* (6th Ed.). Prentice-Hall International, Inc., Englewood Cliffs: N.J.

Johnson, D.W. & Johnson, R.T. (1994). *Learning Together and Alone: Cooperative, competitive, and individualistic learning* (4th ed.). Englewood Cliffs, N.J: Prentice Hall.

Johnson, D.W., & Johnson, R.T. (1994). Learning Together. In Sharan, S. (Ed.). *Handbook of Cooperative Learning Methods.* Greenwood Press, Westport, CT.

Johnson, D.W., & Johnson, R.T. (1992). *Creative controversy: Intellectual challenge in the classroom.* Interaction Book Company:Minnesota.

Johnson, D.W., & Johnson, R.T. (1990). Cooperative learning and achievement. *In Sharan, S. (ed.). Cooperative learning : Theory and research.* Praeger:New York.

Johnson, D.W., & Johnson, R.T. (1989). *Cooperation and competition: Theory and research.* Edina, MN: Interaction Book Company.

Johnson, D.W., & Johnson, R.T. (1987). *Learning together and alone: Cooperative, competitive and individualistic learning. (2nd ed.).* Prentice-Hall, Inc. Englewood Cliffs:New Jersey.

Johnson, D.W., Johnson, R., & Maruyama, G. (1983). Independence and interpersonal attraction among heterogeneous and homogeneous individuals. *Review of educational research,* 53, 5-54.

Johnson, D.W., Johnson, R., & Smith, K. (1991). *Cooperative learning: Increasing college faculty instructional productivity.* Ashe-Eric Higher Educational Report, No.4, Washington D.C. The George Washington University.

Johnson, D.W., Johnson, R., Tiffany, M., & Zaidman, B. (1983). Are low achievers disliked in a cooperative situation? A test of rival theories in a mixed-ethnic situation. *Contemporary Educational Psychology,* 8, 189-200.

Kagan, S. (1992). *Cooperative learning*. Resources for Teachers, Inc. CA 92675.

Kagan, S. (1990). The structural approach to cooperative learning. *Educational Leadership,* (Dec-Jan), 12-15.

Kagan, S. (1990). *Cooperative learning resources for teachers.* San Juan Capistrano: Resources for Teachers.

Kagan, S. (1985). Dimensions of cooperative classroom structures. In Slavin, R., Sharan, S., Kagan, s., Hertz-Lazarowitz, R. Web, C., & Schmuck, R. (Eds.). *Learning to cooperate, cooperating to learn.* New York: Plenum.

Kagan, S., & Kagan, M. (1994). The Structural Approach : Six keys to cooperative learning. In Sharan, S. (Ed.), *Handbook of cooperative learning methods.* Greenwood Press, Westport.

Kemmis, S. (1982). *The Action Research Reader.* Victoria, Deakin University.

Kerr, N., & Bruun, S. (1983). The dispensability of member effort and group motivation losses: Free-rider effects. *Journal of Personality and Social Psychology,* 44, 78-94.

Kohl, H.R. (1969). *The open classroom: A practical guide to a new way of teaching.* New York: New York Review Book.

Kraak, A. (1998). *Competing education and training policy discourse: A 'systemic' versus 'unit standards' framework.* Paper presented at the 10th world congress of comparative education societies. University of Cape Town, July.

Krumboltz, J. (1990). Do schools teach kids to hate learning? *Stanford observer,* Jan-Feb, p10.

Langer, E. & Benenvento, A. (1978). Self-induced dependence. *Journal of Personality and Social Psychology,* 36, 886-893.

Lasley ll, T.J., & Matczynski, T.J. (1997). *Strategies for Teaching in a Diverse Society: Instructional Models.* Wadsworth Publishing Company. ITP - USA.

Latane, B., Williams, K., & Harkins, S. (1979). Many hands make light work: The causes and consequences of social loafing. *Journal of Personality and Social Psychology,* 37, 822-832.

Laughlin, P. (1972). Selection versus reception concept-attainment paradigms for individuals and cooperative pairs. *Journal of Educational Psychology,* 63 (2), 116-122.

Laughlin, P. (1965). Selection strategies in concept attainment as a function of number of persons and stimulus display. *Journal of Experimental Psychology,* 70 (3), 323-327.

Lazarowitz, R., Hertz-Lazarowitz, R., and Jenkins, J. (1985). "The effects on modified jigsaw on achievement, classroom social climate and self-esteem in high school science classes." In Slavin et al. *Learning to cooperate, cooperating to learn.* New York:Plenum.

Lazarowitz, R., & Karsenty, G. (1990). Cooperative learning and students' academic achievement, process skills, learning environment, and self esteem in tenth grade biology classrooms. In Sharan, S. (Ed.). *Cooperative learning: Theory and Research.* Praeger: New York.

Leavey, M.B., Slavin, R.E., & Madden, N.A. (1986). *Team-Accelerated Instruction-Mathematics.* Watertown, MA: Mastery Education Corporation.

Lewin, K. (1946). *Resolving social conflicts.* Harpers:New York.

Lewis, C., & Bot, M. (1998). Provincialisation of education: A review. *Edusource Data News,* 23, 6.

Lotan, R.A., & Whitcomb, J.A. (1998). *Groupwork in Diverse Classrooms: A casebook for educators.* Teachers College Press, New York.

McNiff, J. (1988). *Action Research: Principles and Practice.* London, Macmillan Education Ltd.

Mercer, N. (1995). Classrooms, Language, and Communication. In Moon, B., & Mayes, A.S. (Eds.). *Teaching and Learning in the Secondary School.* Routledge: London.

Mehl, M.C. (1990). Science education in South Africa: Future directions from present realities. In Nkomo, M. (Ed.). *Pedagogy of domination.* Africa World Press: New Jersey.

Moreno, J. (1953). *"Who shall survive?"* Beacon Hose:New York.
Morris, A. & Hyslop, J. (1990). Education in South Africa: The present crisis and the problem of reconstruction. *Social Justice,* 18(1-2), 259-270.

Nixon, J. (1995). Teachers and cross-cultural counselling. In Moon, B., & Mayes, S. (Eds.). *Teaching and Learning in the Secondary School.* Routledge: London.

Oja, S., & Smulyan, L. (1989). *Collaborative Action Research: A developmental Approach.* London: The Falmer Press.

Park, T. (1995). Kooperatiewe kleingroepe: 'n panasee of parachronisme. *South African Journal of Education,* 15 (1), 40-44.

Patton, M.Q. (1990). *Qualitative Evaluation and Research Methods* (2nd ed). Newbury Park, CA: Sage Publications.

Presseisen, B.Z. (1992). A perspective on the evolution of cooperative thinking. In Davidson, N., & Worsham, T. (Eds.). *Enhancing thinking through cooperative learning.* New York: Teachers College Press.

Quicke, J. (1999). *A curriculum for life: Schools for a democratic learning society.* Open University Press:Buckingham.

Reasoner, R.W. (1986). *Building Self-esteem.* Consulting Psychologist Press, Palo Alto, CA 94306.

Report of C2005 Review Committee. (2000). Executive summary. Pretoria.

Sagor, R. (1992). *Hoe to conduct collaborative action research.* Alexandria, Va.: Association of Supervision and Curriculum Development.

Sapon-Shevin, M., & Schniedewind, N. (1990). Selling cooperative learning without selling it short. *Educational leadership,* (Dec-Jan), 63-65.

Schensul, J., & Schensul, S. (1991). Methods of inquiry for social change. In Le Compte, M., Milroy, W., & Preissle, J. (Eds.). *The Handbook of Qualitative Research in Education.* San Diego: Academic Press.

Schmuck, R.A. (1997). *Practical Action Research for Change.* Skylight Training & Publishing, Inc. Arlington Heights, Illinois.

Schmuck, R., & Schmuck, P. (1988). *Group processes in the classroom.* (Fifth ed.). Broem Publishers:Iowa.

Schniedewind, N., & Davidson, E. (1987). *Cooperative learning, cooperative lives: A sourcebook of learning activities for building a peaceful world.* Wm-C. Brown Company of Publishers: Dubuque, Iowa

Sharan, S. (Ed.). (1990). *Cooperative Learning: Theory, research and practice.* Englewood Cliffs, NJ: Prentice-Hall.

Sharan, S. (1980). Cooperative learning in small groups: Recent methods and effects on achievement, attitudes, and ethnic relations. *Review of Educational Research,* 50, 241-271.

Sharan, S., & Shachar, H. (1988). *Language and learning in the cooperative classroom.* Springer-Verlag:New york.

Sharan, Y., & Sharan, S. (1987). Training teachers for cooperative learning. *Educational leadership,* 45(3), 20-25.

Sharan, S., & Sharan, Y. (1976). *Small-group teaching.* Englewood Cliffs, NJ: Educational Technology Publications.

Sherman, R., & Webb, R. (1988). *Qualitative research in education: Focus and methods*. Falmer Press:London.

Slavin, R.E. (1990). Comprehensive cooperative learning models: Embedding cooperative learning in the curriculum and the school. In Sharan. S. (Ed.). *Cooperative learning: Theory and research.* Praeger:New York.

Slavin, R.E. (1987). Cooperative learning and the cooperative school. *Educational leadership,* 45(3), 7-13.

Slavin, R.E. (1986). *Using student team learning.* (3rd ed.). Baltimore: Johns Hopkins University Centre for research on elementary and middle schools.

Slavin, R.E. (1985). Cooperative learning: Applying contact theory in desegregated schools. *Journal of Social Issues,* 41, 45-62.

Slavin, R.E. (1983). *Cooperative Learning: Research on teaching monograph series.* Longman: New York.

Slavin, R.E. (1978). Student teams and achievement divisions. *Journal of research and development in education,* 12, 39-49.

Smith, R. (1987). A Teacher's View On Cooperative Learning. *Phi Delta Kappan,* 68(9), 663-665.

Stenhouse, L. (1975). *Introduction to curriculum research and development.* Heinemann Education.

Stevens, R.J., Madden, N.A., Slavin, R.E., & Farnish, A.M. (1987). Cooperative integrated reading and composition: Two field experiments. *Reading research quarterly,* 22, 433-454.

Stevenson, R.B. (1995). Action research and supportive school contexts: Exploring the possibilities of transformation. In Noffke, S.E., Stevenson, R.B. (Eds.). *Educational Action research: Becoming Practically Critical.* Williston: Teachers College Press.

Stuart, J. (1988). Action Research and Reflection-In-Action*:* A Case study of Teacher's Research into Development Studies Teaching in Lesotho. *Carribbean Journal of Education,* 15, 119-144.

Taylor, N. (1999). Curriculum 2005: Finding a balance between school and everyday knowledge. In Taylor, N. & Vinjevold, P. (Eds.). *Getting learning right.* The Joint Education Trust, South Africa.

Taylor, N. & Vinjevold, P. (1999). Teaching and learning in South African schools. In Taylor, N. & Vinjevold, P. (Eds.). *Getting learning right.* The Joint Education Trust, South Africa.

Vakalisa, N.C. (1996). *Participative Teaching.* In Jacobs, M., & Gawe, N. (Eds.). Teaching-Learning Dynamics: A participative approach. Heinemann Higher & Further Education:Isando.

Van den Berg, O.C. (1994). *Innovation under apartheid: Collaborative action research in a South African University.* UMI Dissertation Services. Bell & Howell Company:Michigan.

Vinjevold, P., & Taylor, N. (1999). Research methods. In Taylor, N., & Vinjevold, P. (Eds.). *Getting learning right.* The Joint Education Trust, South Africa.

Vygotsky, L.S. (1978). *Mind in Society: The Development of Higher Psychological Processes.* Cambridge: Harvard University Press.

Walz, G.R., & Bleuer, J.C. (1992). *Student self-esteem: A vital element of school success.* Counselling and Personnel Services, Inc.: Michigan 48106.

Wamahiu, S. & Karagu, A. (Eds.). (1995). Qualitative research in education in *Issues in educational research in Africa.* East African Educational Publishers:Nairobi.

Whyte, W.F. (1991). *Participatory action research.* Sage Publications:California.

Winter, R. (1987). *Action Research and the Nature of Social Inquiry: Professional Innovation and Educational Work*. Aldershot: Avebury.

Winter, R. (1989). *Learning from Experience: Priciples and Practice in Action Research.* London: Falmer Press.

Appendix 1

32 Columbine Street
Malabar
Port Elizabeth
6020
15 August 1995

The Director
Department of Education
Port Elizabeth
6000

Dear Sir

I am a teacher at Paterson Senior Secondary School in Schauderville. I am currently registered as a PhD candidate at Rhodes University. I am hoping to do research at a few local schools in Port Elizabeth, especially those in close proximity to my own school.

Due to the challenges that I am experiencing in my own classroom, I have decided to research the area of cooperative learning. I will be investigating how cooperative learning can be developed to enhance the teaching of Biology. The advantages of this teaching method as reported by research in other countries is described in my research proposal.

I would thus like to inform you of my intentions. I would greatly appreciate it if your department could acknowledge this study. This will help me when I approach schools to be part of this research.

I believe education to be a dynamic process. We are experiencing changes in various ways. Teachers in general need to be ready to meet these challenges. Research within the classroom will benefit both teacher and learners.

Please do not hesitate to request further details of my intended research if required.

I look forward to hearing from you.

Thanking you in anticipation.

Yours faithfully
P. Pillay

Appendix 2

Appendix 2

DEPARTMENT OF EDUCATION AND CULTURE
PROVINCE OF THE EASTERN CAPE
DEPARTEMENT VAN ONDERWYS EN KULTUUR
OOS-KAAP PROVINSIE
ISEBE LEMFUNDO NENKCUBEKO
IPHONDO LEMPUMA-KOLONI

Reference / Verwysing : / Ireferensi

Enquiries / Navrae : / Imibuzo: A BARNARD

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Office of the / Kantoor van die / I-ofisi
Regional Director
Private Bag X3931
PORT ELIZABETH
6056

1995-08-23

Mr P Pillay
32 Columbine Street
Malabar
PORT ELIZABETH
6020

Sir

ACKNOWLEDGEMENT OF STUDY

The Department fully supports your research and registers its willingness to assist you.

However, it should be noted that :

- principals of individual schools should be approached;
- the activities should not interfere with teaching and learning.

Wishing you well.

NUNE MGODUKA
REGIONAL DIRECTOR
WESTERN REGION

Appendix 3

27 September 1995

First Official Meeting of the Collaborative Research Team

AGENDA

1. Opening and Welcome
2. Introductions
3. a. members present
   b. apologies
4. Launch of the Research Project
5. Brief comments from members with regard to any issues regarding the teaching process or education in general.
6. Background to the Research thus far
7. Outline of the Proposal
   a. title
   b. goals
   c. method
8. Readings
9. How to proceed
10. General
11. Close

Appendix 4

26 September 1995

Dear ...

Firstly, I would like to welcome you as a member of our research team. I am indeed grateful to both you and your school for agreeing to be part of an investigation that could revolutionize the teaching of our subject, biology.

I am excited about this project and am looking forward to working with you. Our research is new. We will be breaking new ground. This could affect many teachers in the future.

Our Director of Education, relevant principals and heads of department have been informed about this research. They have all been supportive. It is therefore possible for us to undertake various aspects of our teaching as a team. I am thinking in terms of exams etc. This will be discussed further at our meetings.

The full research team consists of seven teachers from four schools and is as follows:

Patricia	St. James
Cindy [alias used]	Springdale High [alias used]
Peter [alias used]	Springdale High
Charles	Newell
Helen	Newell
Shireez	Paterson
Sivan	Paterson

The first meeting will provide an opportunity for us to meet one another.

Thank you once again for your interest in trying to improve our practice of teaching.

_____

Sivan (facilitator / co-researcher)

About the enclosed readings:

1. Please do not panic!!! I am not asking you to read all of these articles.
2. I have numbered and underlined several topics of articles relating to cooperative learning and action research. The full reference details of the articles are listed below them.
3. Some of the articles are no more than two pages in length.
4. I would suggest that you scan pieces of numbers 28 and / or 26 to get the feel of action research.
   Any one or two of the many articles on cooperative learning, 1, 2, 3, 4, 6, etc.

Why I have included so many articles:

5. I am trying to ensure that I do not impose my own views or ideas. Most of these readings will allow you to form your own views.
6. I am also hoping that you will find a topic/s that will interest you.

Please Note:

You are <u>not</u> reading as for an exam etc. You will <u>not</u> be asked to discuss at length any topic. You are reading to get a feel for the area that we are investigating.

There will be parts that we do not grasp or understand in our readings. That's quite normal! Simply make a note so that we may try and figure it out together.

We are trying to teach children to work cooperatively, we might as well give it go ourselves.

References on Cooperative Learning and Action Research

1. Introduction p.4-5
2. What is Collaborative Learning? p.9-10
   Goodsell, A., Maher, M., Tinto, V., Smith, B.L., & MacGregor, J. (1992). Collaborative Learning: A Sourcebook for Higher Education. NCTLA. Pennsylvania.
3. Why Cooperative Learning and Living? p.7-12
   Schniedewind, N., & Davidson, E. (1987). Cooperative Learning, Cooperative Lives: A Sourcebook of Learning Activities for Building a Peaceful World. Wm. C. Brown Company Publishers. Dubuque, Iowa.
4. Learning to Cooperate, Cooperating to Learn. Basic Concepts. p.1-3.
   Schmuck, R. In Slavin,R., Sharan, S., Kagan, S., Hertz-Lazarowitz, R., Webb, C., & Schmuck, R. (1985). Learning to Cooperate, Cooperating to Learn. Plenum Press. New York.
5. What is Cooperative Learning? p.1-13.
   Johnson, W., Johnson, R., & Smith, K.A. (1991). Cooperative Learning: Increasing College Faculty Instructional Productivity. The George Washington University. Washington,DC.
6. Appropriate use of Cooperative, Competitive and Individualistic Instruction. p.1-21. Johnson, D., & Johnson, R. (1987). Learning Together and Alone. Prentice-Hall Inc., Englewood Cliffs, New Jersey.
7. Koöperatiewe Kleingroepe: 'n panasee of parachronisme.
   Park, T. (1995). South African Journal of Education,15(1), 40-44.
8. Cooperative Learning: Potential and Implications.
   Brombacher, A. (1994). Stimulus, 2(3). p.1-2.
9. Groupwork as a Strategy for Classrooms.
10. Why Groupwork?
11. The Dilema of Groupwork.
12. Preparing Students for Cooperation.
13. The Teacher's Role: Letting go and teaming up.

14. Evaluating your Engineering.
Cohen, E.G. (1994). Designing Groupwork: Strategies for Heterogeneous Classrooms. Teachers College Press. NY.
15. An Introduction to Cooperative Learning Research. p.5-15.
Slavin, R. In (same as nr.4)
16. On Cooperation in Schools.
Johnson, D. & Johnson, R. (1987). Educational Leadership. 45(3). p.14-19.
17. Cooperative Learning and the Cooperative School.
Slavin, R. (1987). Educational Leadership. 45(3). p.7-13.
18. Structuring Cooperative Learning. p.43-63.
Johnson, D. & Johnson, R. (same as no.6).
19. Training Teachers for Cooperative Learning.
Sharan, Y. & Sharan, S. (1987). Educational Leadership, 45(3). p.20-25.
20. Cooperative Learning Methods. p.23-30.
Slavin, R. (1983). Cooperative Learning. Longman. NY.
21. Models of Cooperative Learning. p.31-33.
Schniedewind, N. & Davidson, E. (1987) (same as no.3)
22. Cooperative Learning and the Jigsaw Approach. p.3-14.
Coelho, E., Winer, L. & Winn-Bell Olsen, J. (1989). All Sides of the Issue: Activities for Cooperative Jigsaw Groups. Alemany Press. Hayward, California.
23. The Effects of Modified Jigsaw on Achievement, Classroom Social Climate, and Self-Esteem in High School Science Classes. p. 231-248.
Lazarowitz, R., Baird, H.J., Hertz-Lazarowitz, R., & Jenkins, J. (In - same as no.4)
24. The Instructor's Role in Cooperative Learning. p.57-79 .
25. Conclusions. p. 120-126.
Johnson, D., Johnson, R., & Smith, K. (same as no.5)
26. Changing your teaching: The Challenges of the Classroom.
Davidoff, S., & Van den Berg, O. (1990). Changing your Teaching: The Challenges of the Classroom. Pietermaritzburg. South Africa.

27. Collaborative Action Research. p.1-25.
Nodie Oja, S., & Smulyan, L. (1989). Collaborative Action Research: A Developmental Approach. Falmer Press, Basingstoke, Hampshire.
28. Action Research. p.217-241.
Cohen, L., & Manion, L. (1994). Research Methods in Education. (4th ed.). New York, Routledge.
29. The Nature of Action Research. p.5-27.
Kemmis, S., & McTaggart, R. (Eds).The Action Research Planner Deakin University, Victoria, Australia.
30. What Action Research is: Its Uses and Limitations. p.1-9.
McNiff, J. (1988). Action Research: Principles and Practice. Macmillan Education, Hong Kong.

Appendix 5

2 November 1995

Second Meeting of Collaborative Research Team

AGENDA

1. Welcome
2. Introductions
3. Apologies
4. Problems / questions for discussion regarding previous meeting or readings.
5. Areas for discussion:
   a. action research
   b. cooperative learning
   c. cooperative methods
6. Brief comments on progress thus far and planning for next meeting.
7. general concerns
8. date for next meeting
9. close

Action Research

one definition:

action research is small-scale intervention in the functioning of the real world and a close examination of the effects of such intervention.

The ultimate objective is to improve practice.

Essential features:

- situational
  it is concerned with diagnosing a problem in a specific context
  and attempting to solve it in that context.
  on-the-spot procedure.

- usually collaborative
  teams of researchers working together.

- participatory
  team members involved directly or indirectly in implementing
  the research.

- self-evaluative
  modifications are continuously evaluated within the ongoing
  situation.

Other:

relies heavily on observation and behavioural data.

During the project:

Information is collected, shared, discussed, recorded, evaluated and acted upon. This will form the basis of reviews of progress.

Action research spiral (see article numbered 29, p.11)

steps:

plan, act and observe, reflect

revised plan, act and observe, reflect ....

the qualities of flexibility and adaptability makes action research workable in the

school setting.

Cooperative learning
definition:
the instructional use of small groups so that students work together to maximize their own and each other's learning.

an interaction pattern in which the goals of separate individuals are linked together in such a way that an individual can achieve his/her goal only if the other participants achieve their goals.

essential features:

positive interdependance
that every learner contributes
that students work constructively, helping each other
individual accountability and personal responsibility

see attached articles for further explanations.

Methods/models
see article numbered 21. p. 31-34.

Appendix 6

4 December 1995

Third Meeting of the Collaborative Research Team

Agenda

1. Welcome
2. Introductions
3. Apologies
4. Discussion and negotiations with regard to:

   a. cooperative method

   b. standard to be taught

   c. time allocation for cooperative lesson structures

   d. proposed chapters

   e. discussion of an example of a cooperative lesson

   f. division of lesson preparations

   g. when should first cooperative lessons be taught

   h. preparing of learners for cooperative lessons

5. readings : articles - 18 to 21.
6. general
7. how to proceed?
8. close

Cooperative Learning Methods

Student Team Learning
- most extensively researched and widely used methods
- developed by Slavin, De Vries, Edwards at Johns Hopkins Univ.
- Following in widespread use:
- Student Teams-Achievement Division (STAD)
- Teams-Games-Tournament (TGT)
- Jigsaw II
- Team Assisted Individualization (TAI)

STAD
- learners assigned to 4 or 5 member learning teams
- high, low, average performing, girls and boys
- different racial, ethnic backgrounds
- team microcosm of class
- each week, teacher introduces new material in a lecture or discussion
- team members then study worksheets on the material
- they may work problems out one at a time in pairs
- they may take turns testing each other
- they may discuss problems as a group
- or whatever means they wish to master the material
- learners given worksheet answersheets
- this makes it clear that they are to learn concepts and not merely fill in answersheets
- team members are told that they are not finished studying until they are sure that they understand the material

- Following the practice, learners take a test on the material
- teammates may not help one another - they are on their own in this stage
- tests marked in class or shortly thereafter
- formed into teamscores by teacher
- the amount each learner contributes to his/her team is determined by the amount the learner's test score exceeds the learner's own past test average

- base scores is set 5 points below each learner's average, and learners earn points, up to a maximum of 10, for each point they exceed their base score
- perfect scores always receive the max of 10
- the individual improvement score system gives each learner a chance to contribute maximum

- this method has been shown to increase learner academic performance even without teams
- it avoids the possibility that low performing learners will not be fully accepted

- teams with the highest scores are recognised in a weekly one-page class newsletter
- those exceeding by the largest amounts or who get perfect scores are also recognized

Jigsaw (Aronson)

- learners assigned to 6 member teams
- academic material broken down into 5 sections
- each team member reads his/her own unique section, except for 2 learners that share a section (to cater for a learner being absent)
- members of different teams who have studied the same section meet in "expert groups" to discuss their sections
- since the only way learners can learn the other sections is to listen carefully to their teammates, they are motivated to support and show interest in each other's work
- Jigsaw does not use an incentive structure
- following team drilling, learners take individual tests covering all the topics and receive individual grades
- Jigsaw creates interdependence

Jigsaw II (Slavin)

- modification of jigsaw
- learners work in 4 or 5 member teams
- instead of unique section, all learners read a common passage/ chapter
- then learners given topics on which to become an expert
- expert groups meet to discuss their topic
- return to their teams to teach what they have learned
- learners take individual tests
- team scores formed
- improved scores used to form team scores
- highest scoring teams and individuals recognized in a class newsletter.

Learning Together (Roger and David Johnson)

- learners work in 4 to 5 heterogeneous groups on assignment sheets
- groups hand in single sheet
- receive praise as a group based on how well they are working together and how they do on the task.

Group Investigation (Sharan and Sharan)

- learners work in small groups
- using cooperative inquiry, group discussion, and cooperative planning and projects
- students form their own 2 to 6 member groups
- groups choose subtopics from a unit being studied by the entire class
- they further break subtopics into individualized tasks and carry out the activities necessary to prepare a group report
- group makes presentation or display to communicate its findings to entire class
- evaluated on quality of report

There are many ways to set up a cooperative classroom. The ideal would be

to create a unique model for our learners. It is also best to move from simple to more complex cooperative procedures
(to build skills of learners).

Cooperative lesson structure for a group with 4 members.

1. The chapter is divided into lesson units.
2. Each lesson has enough (not too much) material for each of the team members.
3. The main points of the whole lesson has been worked out where necessary and divided into subtopics for the different members.
4. Each member sees the structure of the whole lesson and where his/her part slots in.

Appendix 7

07 February 1996

Meeting 4 - Collaborative Team

Agenda

1. Welcome
2. Apologies

   Members Present
3. Report on class allocation, class size, etc.
4. Preparation for Implementation

   a. data collection techniques discussion and negotiation

   b. preparation and discussion of lessons/chapters (w/shop)

   c. exams - what are our options?

   d. getting learners ready for cooperative structured lessons
5. General
6. Close

Appendix 7b

17 February 1996

Meeting 5: ECOLOGY WORKSHOP

Agenda

1. Welcome
2. Members present / Apologies
3. Presentation and discussion of lessons on the ecology chapters

   [Sivan and Shireez – Paterson High]
4. Data collection
5. Date for reflective session
6.
7.

Included, find:

a. Topics of lessons
b. Lesson plans
c. Copies of articles not adequately covered in the textbook
d. Data collection reminder

Appendix 8

25 March 1996

Meeting 6 : Collaborative Research Team
Reflection on cooperative lessons to date:

AGENDA

1. Welcome

2. Apologies
   Members present

3. General comments on the process to date in our classes.

4. Identification of problem areas.

5. Identification of possible solutions for implementation.

6. Identification of positive aspects of cooperative lessons.

7. Preparation of next cooperative chapter.

8.

9.

10. Date for next meeting.

Appendix 9

25 June 1996

Meeting 7 : Collaborative Research Team

Reflection on Second Term's Cooperative Lessons

Agenda

1. Welcome
2. Members present

   Apologies
3. General comments on the second term's work.
4. Positive aspects of the revised cooperative structured lessons.
5. Comments regarding June exams.
6. Identification of problem areas.
7. Identification of possible solutions.
8. How to proceed with regard to:
   - remaining 4 chapters
   - work distribution
9. Plan for third term's cooperative lessons.
10. Data collection
11.
12.
13.

14. Date for next meeting.

Appendix 10

18 September 1996

Meeting 8 : Collaborative Research Team

Reflecting on Third Term's Cooperative Lessons

Agenda

1. Welcome
2. Members present
   Apologies
3. General comments on third term's work
4. Positive aspects of the revised cooperative structured lessons
5. Identification and discussion of problems encountered
6. Identifying possible solutions

7. Procedure for fourth term:
   final two chapters
   examinations

8. Data collection reminder
   learners' comments
   interviews
   tape recordings

9. General
10. Date for next meeting
11. Close

Appendix 11

19 December 1996

MEETING 9 : Collaborative Research Team

Reflecting on Fourth Term's Cooperative Lessons

Agenda

1. Welcome
2. Apologies
3. General comments on fourth term's work
4. Positive aspects of revised cooperative structured lessons
5. Identification and discussion of problems encountered
6. Identifying possible solutions

7. Plan for further discussions of research team

8. Next phase of research
   a. outstanding data collection (learner's diaries, teacher's log, exam results, etc.)
   b. writing up of research

9. Brief comments on past year that we worked together

10. General

11. Proposed date for evaluation and discussion of cooperative work of the whole year

12. Thanks and close

Appendix 12

QUESTIONNAIRE ON YOUR COOPERATIVE LEARNING EXPERIENCE

Name:_____ Grade: ___

address:_____ School: _____

Telephone:_____

PLEASE ANSWER THE FOLLOWING QUESTIONS FULLY AND HONESTLY. YOUR RESPONSES ARE IMPORTANT FOR FUTURE WORK WITH OTHER LEARNERS.

1. During the first half of the year you had a whole chapter of cooperative lessons at a time. In the second half of the year we mixed cooperative lessons with traditional lessons by the teacher.
   Which half was better for your learning?

   Give at least two reasons for your choice above

   ---

2. In the first term you were given the chance to become the expert on one section of the work. Later on you had to prepare and learn all parts of the work for discussion. Which helped you learn the work better?

   Give reasons for your answer

   ---

3. There were times when the teacher placed you in a group. At other times you were allowed to form your own group. Which method of group

formation did you work better in?

Give reasons for your choice.

---

3. List three things you enjoyed / liked best about working with members in your group(s) over the year.

---

4. List three of the main problems you had with members of your group(s) over the year.

---

5. In the last term, you had to write a short test after each cooperative lesson unit in what way did this help you and your group learn the work?

If this did not help you learn the work, give reasons why not.

---

7. What did you do when you could not understand what another group member was discussing with you?

---

8. How do you suggest we can improve on the cooperative learning that we did this year?

FOR THE FOLLOWING QUESTIONS YOU MUST CIRCLE YES (Y) OR NO (N) AND EXPLAIN YOUR ANSWER:

9. Did cooperative learning allow you to get to know your classmates better?

Y N *EXPLAIN*: ----------

---

10. Did cooperative learning make you in any way change your opinion with with regard to the ability of any other member(s) in your group?

Y N *EXPLAIN:* ----------

---

11. Did cooperative learning help you understand the work you were doing?

Y N *EXPLAIN*: ----------

---

12. Did your participation in your group make you a more confident person in any way? Y N

EXPLAIN: ----------

---

13. Do you think you would have enjoyed your year any better in the Grade 10 Biology class if you did not have cooperative lessons? Y N

EXPLAIN: ----------

---

14. Would you like to continue with cooperative learning next year? Y N

EXPLAIN: ----------

---

15. Do you think other learners in other subjects and grades would find it helpful to have cooperative structured lessons? Y N

EXPLAIN: ----------

---

16. Would you like to do cooperative work in other subjects too? Y N

EXPLAIN: ----------

Thank you for your *cooperation!!*

Appendix 13

LEARNER INTERVIEWS: TRANSCRIPTS

INTERVIEW WITH THE LEARNERS OF NEWELL

Sivan: - Thank you for being here today. I know that many learners are already at home having a nice time, so thank you for coming in to help us. I will be asking you to answer some questions about your year in the Biology class. There are no right or wrong answers. The best answers are those that reflect your true feelings, honestly about what you are being asked.

Sivan: - This year we tried out a new teaching method called cooperative learning. You had a chance to try it out over the year. To start off, how do you feel about your year in the std.8 Biology class? You may compare it with any of your other classes, Geography, History and so on.

Learner: - I feel very good with this programme. Last year we did not do things so practically. This year we did things practically. We had to find an ecosystem and things like that. My results improved this year.

Sivan: - Thanks, someone else.

Learner: - Yes, I was inspired because of this cooperative work.

Sivan: - [Silence followed after above responses] Everyone, please make a short comment, you must know how you felt about the year. Don't feel that you have to say that it was good and don't be scared of each other. Even if you say you hated it or that it was terrible , it will be okay with me.

Learner: - I think it helped me a lot, the cooperative method. I passed it, it Improves my work and it should happen next year. When I don't know something, the others tell me and you gain a lot.

Sivan: - Someone else.

Learner: - I think it was good for me, because we help each other. We are sometimes afraid of the teacher.

Learner: - It was great because we were able to know about nature, ecosystems and a lot of things.

Learner: - This year I repeated std.8 Biology, it was different to last year, I enjoyed it much more.

Sivan: - Good. I think we are no longer scared to speak now. What to you was better about the cooperative method as compared to the traditional method of teaching?

Learner: - The cooperative was better because you concentrate a lot more. In traditional the teacher speaks and you fall asleep, you don't concentrate.

Learner: - If I have problems, I ask other learners.

Learner: - It was good, I do the work myself.

Learner: - It was good, we find the answers by ourselves. We use other books, not only std.8 books only.

Sivan: - Someone else.

Learner: - It was good for me too, because I like working with other people, they can help me too.

Sivan: - Do you think that cooperative work gave you an opportunity to help others?

Group : - Yes.

Learner: - She says no.

Sivan: - It did not give you a chance to help someone?

Learner: - [laughter] He's lying.

Sivan: - Did it give you a chance?

Learner: - Not always, but some of the times.

Sivan: - In which method, cooperative or traditional were you more relaxed?

Group: - Cooperative.

Sivan: - Why?

Learner: - You work with people.

Learner: - You're speaking out all the time.

Learner: - You're cooperating with others.

Sivan: - When you were more relaxed, did you find that you spoke about other things besides your work, like the weekend's happenings, what you're

going to eat when you get home, and so on?

Group: - Sometimes.

Sivan: - Sometimes - did this happen during your work or after completing your work?

Learner: - We first completed our work, and then spoke other things.

Learner: - I liked the way we finished our work and then do other things.

Learner: - I like that the teacher leaves us to go on with our work and not stand on us.

Sivan: - What happened when you had problems with a particular question? What did you do?

Learner: - Go to the teacher.

Learner: - I ask someone else in the group.

Learner: - Asked someone in my group or another group.

Sivan: - Tell me one thing that you liked about cooperative learning.

Learner: - When we helped each other.

Learner: - We can hear other person's views.

Learner: - Get to know one another, help one another.

Learner: - Get answers by ourselves.

Learner: - We work with others.

Learner: - We got homework and gained knowledge.

Learner: - We were trying and sharing.

Sivan: - Did you feel afraid to ask for help in your group?

Group: - No..

Learner: - We ask our friends in the group to explain over so that we understand.

Sivan: - Can each one please give one thing that you did not like about Cooperative learning. Something you found hard.

Learner: - Sometimes you are not in the mood to speak and cooperative learning wants you to speak and participate.

Learner: - After weekend, someone's busy and don't come to school and we're depending on him.

Sivan: - So someone's absent?

Learner: - Yes.

Learner: - Sometimes in groups others don't want to participate in the group, don't even do the work and just say they can't do it.

Learner: - Some want to participate but don't like talking in front of others.

Learner: - Some like joking too much.

Sivan: - What about the amount of work? Was it more with cooperative or traditional?

Group: - Cooperative had less work.

Sivan: - Why?

Learner: - In traditional we make our own notes.

Sivan: - Do think it was less work or perhaps easier?

Group: - Easier.

Sivan: - [laughing] No wonder you like cooperative learning, it was less work and easier.

Group: - Laughter.

Sivan: - Can you remember at the beginning of the year, you were given one question/part to become the expert on. Later on you had to do all the questions. Which was better to learn the work?

Group: - All the questions.

Sivan: - [pointing to a learner] What do you say?

Learner: - Yes, all the questions.

Sivan: - Does any one feel it was better to do just one piece of the work?

Group: - Silence

Sivan: - So you all feel it was better to do all the questions?

Group: - Yes.

Sivan: - Do you prefer the groups that your teacher formed, or do you prefer forming your own group?

Group: - Forming our own groups.

Sivan: - All of you want to form your own group?

Learner: - Sometimes, at least, I don't want to form my own group because I will choose those who understand better, but my teacher puts those

who understand quickly with those who understand a little bit slowly, in this way those who understand slowly can gain a little bit more.

Sivan: - Anybody else?

Group: - Silence.

Sivan: - Do you think there are some ways in which we can make cooperative work even better for perhaps next year's learners?

Group: - Silence.

Sivan: - Was it perfect?

Group: - Yes.

Sivan: - No, I don't think it was perfect. What about the group size. Should it be smaller?

Group: - Yes.

Sivan: - So, there's one way you are saying it can be made better.

Sivan: - How small should the group be?

Learner: - 4

Sivan: - But were you not 4 in a group?

Learner: - Sometimes 6.

Sivan: - What about the questions. Was it easy to find the answers?

Learner: - Not so easy.

Sivan: - Do you agree with him?

Group: - Yes.

Sivan: - I think that you perhaps found it difficult sometimes to find the answers because the 3 school working together used different textbooks.

Sivan: - Most of you came from different classes of last year and perhaps did not know each other. Did cooperative learning help you to get to know each other?

Group: - Yes.

Sivan: - What kind of things did you learn about the person?

Learner: - If he is lazy or cooperative.

Learner: - Is he clever or not.

Learner: - Does he like to talk,

Learner: - Someone who does not like to joke.

Sivan: - Did cooperative learning make you dislike anybody?

Learner: - Sometimes, if the person is lazy.

Sivan: - Someone else?

Group: - Silence.

Sivan: - Do you think you would have understood your work better if there was no cooperative learning and only traditional work?

Group: - No.

Sivan: - No, why do you think you understood better?

Learner: - We were given a chance to speak.

Learner: - We did things practically.

Learner: - Got a lot of different views.

Learner: - We were motivated to work.

Sivan: - Did you always respect the views of others, or did you only think your view was correct?

Learner: - No, we respected other's views.

Sivan: - Did you like that the teacher gave a summary at the end of each unit?

Group: - Yes.

Sivan : - why?

Learner: - So that we know if our answers were right.

Sivan: - Any other comments.

Group: - Silence.

Sivan: - Do you think that you would like to use cooperative learning in other subjects too?

Group: - Yes.

Sivan:- Do you like cooperative work because of better marks in Biology or was it a nice way to learn?

Learner: - It was a nice way to learn.

Sivan:- Anyone feels differently?

Group: - Silence.

Sivan: - What are some of the things you don't like about traditional teaching? When no cooperative work is used.

Learner: - When you ask something, the teacher feels you are wasting his time.

Learner: - You are not given a chance to speak. The teacher is always teaching, and there's no chance for you to say something.

Learner: - You do not get many views from the teacher.

Sivan: - What makes you want to continue with cooperative learning next year?

Learner: - I want to understand better.

Learner: - I like cooperative lessons because you are given a chance to cooperate with others.

Learner: - You are given a chance to improve.

Learner: - It helps to get to know other people better.

Sivan: - For our last question, You always say it makes you understand better. Why do you think cooperative learning makes you understand better?

Learner: - Because you are doing it yourself.

Learner: - You are seeing what you are doing.

Learner: - You search for answers.

Learner: - You are depending on more than the teacher.

Learner: - You are given a chance to think, write and explain.

Sivan: - Are you all looking forward to std.9?

Group: - Yes.

Sivan: - I do hope you will all make it and that you really had a good time this year.

Thank you once again for your help and good luck.

Interview With Learners of Paterson High School

Sivan: - Thank you for coming. I will be asking you questions about the work in you biology for this year. Please be honest about your views. To beg general how did you find your year in the biology class? Give a reason as well.

Shaheed: - Different. - The work was much less. The year was very nice.

Richard: - The year was also different for me. The work was less and people asked sensible questions.

Camilla: - The year was also different for me. The year was nice because I enjoyed speaking to my friends about the work.

Emogene: - Cooperative work was different for me. A person got to know most of your classmates and what you did not know, you asked you friends.

Antonia: - I also found the work different, all worked together.

Nicola: - It was nice. Cooperative work counted a lot in my favour.

Sivan:- Thank you for those answers, but remember as we go on, there are no right or wrong answers. You must answer exactly as you think and give honest opinions. What in general was different about cooperative work? How did it differ from the traditional method?

Richard: - The lessons were not so tedious/uninteresting and you understood better when it was explained in the group. You also understand your friends better. It is better to study because you know what it is about.

Camilla: - The time when the teacher gave the lesson, you felt sleepy and tired of the work. With your friends you are inclined to speak a lot.

Emogene: - I agree with Camilla, because when the teacher speaks, then you feel sleepy, especially on the last period. Then the teacher speaks continuously and the learners don't take notice.

Nicola: - As Richard said, It lets you understand better and all work together.

Sivan: - Some of you said that when the teacher speaks, it is uninteresting. What makes cooperative learning more interesting?

Richard: - Then all do not have to sit quietly while the teacher speaks alone. We speak in the group and later have a chance to explain to the teacher.

Camilla: - When the teacher asks a question, perhaps more than one learner wants to answer. The teacher then gives one a chance and the other must be quiet. In cooperative work all can have their say.

Emogene: - Some are scared to ask the teacher. Because they know their friend, they can ask anything without being shy.

Sivan: - Does anyone want to add anything?

Antonia: - Everyone discussed together and understood.

Richard: - The work was divided and thus easier. The work for the day was not too much and you could understand.

Sivan: - Why do you think you understood better in cooperative learning?

Nicola: - You answered the question by yourself. Sometimes when the teacher speaks, you don't understand.

Antonia: - You did your own work and discussed it in the class. Your attention was there.

Emogene: - Many learners don't do the work when asked to do so in traditional lessons, but for cooperative learning they do it so as not to let themselves and their friends down.

Camilla: - With cooperative learning, if our answers differ, we asked someone in the group or check in our textbooks.

Richard: - The work is less. If the work looks too much then you may leave it undone. If its a little, you do it.

Shaheed: - The same as Richard, the work was less and encouraged you to do it.

Sivan: - Many of you say that you understood the work because you were active in the work. You did not just sit and listen, is this so?

Group: - Yes

Sivan: - Did cooperative work give you an opportunity to help others?

Antonia: - Yes

Camilla: - Yes, but not if somebody did not do his work. I say they cannot just come and write down answers.

Richard: - The same as Camilla.

Shaheed: - There was always someone in the beginning who did not work, but later he felt out of place as he had nothing to say when we discussed.

Sivan: - The question is more if there was opportunity to help others.

Shaheed: - Yes, Sir.

Sivan: - How did you do it?

Shaheed: - By encouraging them to do their work.

Nicola: - Yes. I encouraged and helped friend in my group.

Sivan: - What did you do to encourage members?

Camilla: - If someone in the group did not do their work, we spoke to him/her. They also felt left out.

Antonia: - By telling them how important it is to do the work.

Richard: - I tried to scare them by telling them that it was no joke to spend two years in the same standard.

Sivan: - With which style were you more relaxed? Where were you more at ease with less pressure?

Richard: - When we worked on our own as then you do not have to wait for the teacher to complete. We did our own work, and when we were finished, it is finished and we understood it.

Emogene: - Doing your own work. You become more independent and do not have to depend on the teacher. You depend on yourself.

Shaheed: - Cooperative was better. Friends were not shy to really say what they wanted to.

Camilla: - Cooperative work. You can use your own manner of speaking without worrying if your words are correct or worrying about correct Afrikaans.

Sivan:- I just want to remind you that when you nod your head in agreement as now, it will not be on tape and I may forget about it later.

Sivan: - Many of you say that you were more at ease in cooperative work. Is this because you had a chance to discuss other things like the weekends happenings, or was it better to work?

Richard: - Sir, If you are a chapter behind it's difficult to catch up and every day there's new work. There was no time to talk about the weekend's happenings.

Nicola: - It was better to do the work this way. We did not talk about other things and asked members of the group to stay focussed.

Camilla: - We did the work. But, there is always one who wants to talk about the weekend, then we cannot work and have to listen.

Emogene: - We discussed the weekends happenings but also kept up to date with our work.

Sivan: - What did you do in the group when you experienced problems?

Camilla: - We called the teacher and asked him to explain.

Nicola: - We looked at each one's answers and also checked the textbook.

Emogene: - In the first term we got the answers from the expert members.

Antonia:- We made sure that everyone's answers were the same, and also asked the teacher.

Shaheed: - We first when to recheck the textbook as there was always different answers.

Sivan: - Am I correct in saying that you first checked it out for yourself before you approached me for help?

Group: - Yes Sir.

Sivan: - Name one thing that you liked about cooperative learning.

Richard: The work is less and you get a better chance to learn. At the end the teacher also gives us a chance to talk to make sure that we understand. My marks were also better than last year.

Camilla: - The groups that changed over the year.

Emogene: - The opportunity to discuss the work and other things with your group.

Shaheed: - The opportunity to act as the teacher in the group.

Antonia: - It was easier and you learned better for the examinations.

Nicola: - Much more opportunity to explain and to ask questions yourself.

Camilla: - It was easy and you could also approach the teacher.

Sivan: - What in cooperative work made you angry? What did you not like?

Nicola: - If there was no cooperation.

Camilla: - If someone did not do his work at home.

Richard: - The same as Camilla, because it wastes time.

Shaheed: - The time of the assignments, some did not make the effort to meet at the library. They did not cooperate.

Antonia: - Also cooperation.

Sivan: - Did anyone have a problem with people being playful?

Richard: - Yes, sometimes someone makes a joke and then everyone's attention is on him and you cannot complete the work.

Antonia: - Absenteeism was also a problem.

Sivan: - Was there a problem about people who were shy?

Emogene: - Sometimes, especially at the beginning some were shy.

Camilla: - I was unhappy with some when the teacher placed us in groups.

Sivan: - Richard and Shaheed stated that the work was less. This is actually not so because we did the same amount of work. What was different is that I now gave questions. Do you think this style of asking questions helped?

Richard: - Yes Sir, we did all the questions and it looked less. There were no long questions.

Emogene: - The work looked less and also took less time to complete.

Sivan: - Do you think that the questions made the work less or easier?

Camilla: - Easier to get the answers.

Richard: - The work was more clear. We knew exactly what to do and where to find the answers.

Sivan: - Did cooperative learning make you more confident, if so, why?

Camilla: - It made me more self confident because I did all the work myself.

Shaheed: - I was very confident because I looked up the answers myself and prepared to discuss it to the group the next day.

Richard: - Yes, I learned by myself and explained. It makes it easier and gives self confidence.

Antonia: - It is better if you understand yourself and work it out for yourself.

Emogene: - I had more confidence in myself. There were times when I did not understand and asked my group to help me out. Sometimes we see each other at home as well.

Nicola: - I had confidence in myself. In the beginning I was a bit shy, but with help it improved.

Sivan: - Were you afraid of making mistakes in your group?

Richard: - Yes, because people in your group depend on you.

Camilla: - It was not a problem because we helped each other and checked in the textbook.

Sivan: - At the beginning of the year you were given the chance to become the

expert on a section of the work. Later you were asked to work out all the questions. Which did you prefer and why?

Emogene: - To do all the questions. You and your friends depend on each other, and you get a chance to act as the teacher.

Nicola: - For me also better to do all the questions. If someone is absent then I have all the answers.

Shaheed: - The same Sir, all the questions.

Sivan: - Is there anyone that does not agree?

Group: - No.

Sivan: - So you prefer to be the expert on all the questions?

Group: - Yes.

Sivan: - We now come back to Camilla's point. At the beginning of the year I formed the groups. Later when I felt that you were more responsible, I allowed you to form the group yourself. Which did you prefer to work in?

Nicola: - To form the group myself. The learners of the first group of the teacher did not want to work.

Richard: - The group that you yourself formed. You get on better with the people that you understand.

Camilla: - The group of the teacher. In the groups that we formed ourselves we played a lot and the learners did not want to work.

Emogene: - The group of the teacher. We got to know and understand each other better.

Shaheed: - The teachers group, we got to know each other better.

Antonia: - We made friends with people that we did not previously talk to in the groups of the teacher.

Sivan: - Can you name a few ways in which I can improve on cooperative learning?

Antonia: - If everyone can say how he felt about it and how he went about his work.

Sivan: - This is what I am now asking.

Nicola: - Let learners form their own groups.

Antonia: - People that are lazy need attention.

Camilla: - Mix the groups, lazy and hardworking together.

Richard: - That's basically all, Sir.

Sivan: - What about the size of the group?

Richard: - Four was just right. The smaller the better.

Sivan: - Does everyone feel the same?

Group: - Yes Sir.

Sivan: - What about the questions? Must it be more difficult or was it too difficult?

Richard: - Make the questions clear enough for the learners to understand.

Shaheed: - Not too much scientific language, it must be simple.

Sivan: - Some of you said that you got to know other learners. What type of things did you learn about learners?

Emogene: - Their style of work and personality.

Richard: - Some are not as you had heard about them. You can now see how they are. Maybe they are similar to your style.

Camilla: - People are not as you thought. You thought perhaps that someone was clever and it is not so.

Sivan: - Did you ever think someone to be slow and later found out the person was actually clever?

Shaheed: - Looks can be deceiving.

Group: - Everyone laughs.

Sivan: - So everyone feels the same?

Group: - Yes Sir.

Richard: - You got to learn about people.

Sivan: - Do you think your year would have been better with traditional learning only.

Group: - No Sir.

Sivan: - Let us take it one at a time.

Nicola: - No Sir, it would have been very uninteresting.

Camilla: - No Sir, it is also uninteresting if Sir gives the lesson alone. Everyone feels bored.

Emogene: - Cooperative learning encouraged me to do Higher Grade.

Richard: - No Sir, I prefer the mixture of all two.

Antonia: - No, some are disruptive, they don't listen.

Sivan: - Did you always respect other people's answers even if it was wrong?

Richard: - Yes, as long as they did the work. I don't worry about wrong or right.

Sivan: - Does everyone feel the same?

Group: - Yes Sir.

Sivan: - When we did away with the expert groups, I (the teacher) gave a summary at the end of lesson. Did this help you?

Camilla: - It helped me.

Sivan: - How?

Richard: - It alright to check if your answers are wrong or right.

Sivan: - Who feels that we should leave it out?

Group: - All silent.

Sivan: - Do you think that you'd like to try cooperative work in other subjects?

Richard: - Not in all the subjects.

Shaheed: - In Business Economics Sir.

Richard: - Yes, Business Economics has many long questions and if we can break it up into pieces. Then it will be easier. Maybe the study subjects Sir.

Sivan:- Is there someone that does not feel the same?

Group: - No.

Sivan: - Who feels that their marks would have been better without cooperative work?

Richard: - Sir, It is through cooperative learning that I passed, because last year there was no cooperative learning and I did not do well.

Sivan: - Richard, Is it not because you were repeating the work that you did well? The fact that you were doing the work for the second time.

Richard: - No it's because of cooperative work, I'm positive.

Camilla: - All of us feel that way.

Sivan: - Is that so?

Group: - Yes.

Sivan: - So, cooperative work did not disadvantage your marks?

Group: - No, it did not.

Sivan: - Did you find the teacher to be more relaxed during cooperative work?

Richard: - No, the teacher did not rest. He always came around to the groups to check on our work.

Sivan: - I want to know if the teacher was perhaps less angry, more calm and so on.

Richard: - During cooperative work the teacher spoke less and we preferred that.

Sivan: - To sum up. Nearly all of you preferred the cooperative style. Why is that so?

Nicola: - Cooperative work mixed with traditional was easier.

Shaheed: - Yes Sir, the work was less and I learned better.

Camilla: - The work was better put together (compiled).

Richard: - The same. It was nice.

Sivan: - Does anyone want to add anything?

Group: - Silence.

Sivan: - Would you like to continue with cooperative learning next year?

Group: - Yes Sir.

Nicola: - In other subjects too.

Sivan: - That I can't promise, but we will see. I must say that I enjoyed working with you this year. Thank you for coming along to help me. I wish you all the best with your work in the future.

Interview With the Learners of St. James Secondary School

Sivan:- Good morning to you two, Candice and Edwinita. Even though you are only two present, thank you very much for coming. I am going to ask you about the year's work, especially that which relates to cooperative learning. All the questions that I will ask deals with cooperative learning as compared to the traditional teaching method. In traditional teaching, the teacher stands in front of the class, makes a presentation,

writes on the board, asks questions and so on. In cooperative work, you were in groups, every learner had a task and has to make a contribution and had to help each other.

There are no right or wrong answers to my questions. All I ask is that you give your honest opinion or view when asked a question. Is that clear to you?

Both: - Yes Sir.

Sivan: - What you will share with me will probably help me to help other learners next year. Do you want to say or ask anything before we start?

Both: - No Sir.

Sivan: - To start, how did you feel this year about your work in the biology class with the cooperative work? Give me a reason for your answer too.

Candice: - It was better for me because over all the years it was the teacher who explained alone, the learners did nothing. We just wrote and did small tasks, but this year it was better because you had to work at home, summarize work, and had to, ... I don't know.

Sivan: - report back?

Candice: - Yes.

Sivan: - Thank you, and you Edwinita?

Edwinita: - It was also better for me. We worked in groups and began to get to know each other and we communicated.

Sivan: - Okay. So both of you feel that you enjoyed the year?

Both: - Yes Sir.

Sivan: - You were now introduced to cooperative work this year. Maybe you did some group work in the past. What was different about cooperative work in comparison with traditional work in your biology class?

Candice: - In cooperative work, we worked in groups. In traditional work, the teacher worked alone. In cooperative we did tasks and reported back and it was better than the teacher explaining alone and making us feel bored.

Sivan: - You speak about doing tasks, summaries and reporting back. What other things did you do?

Edwinita: - Got more insight into the work, Sir.

Sivan: - What gave you more insight into the work?

Edwinita: - When we did the tasks at home, we understood better.

Sivan: - When you say tasks, do you mean the questions that you had to work out?

Both: - Yes Sir.

Sivan: - Where were you more active: Cooperative or Traditional work?

Both: - Cooperative work, Sir.

Sivan: - Did you enjoy being more active?

Edwinita: - Yes. And it let you understand.

Sivan: - Many learners say they understand better with cooperative work. Why do you think a person understands better? Why does cooperative work let you understand better?

Edwinita - For me Sir, we did research and when you look up the answers, you understand better.

Candice: - If you do research then you must understand because you perhaps went to the library. You can't go wrong because you looked at the work in more detail. If the teacher explained, you just wrote down and did not worry further.

Sivan: - What about the fact that you had to explain to other, did it help you?

Both: - Yes Sir.

Sivan: - Did you have an opportunity to help others during cooperative work and how did you feel about it?

Both: - Yes Sir.

Candice: - Some of the learners when we worked in groups, made a contribution. When the teacher explained, you were quiet and said nothing.

Sivan: - For you personally, was there opportunity to help others?

Candice: - Yes Sir.

Sivan: - And how did you feel about it?

Candice: - I felt good about it because if someone did not understand, I gave her my opinion and helped her to understand.

Sivan: - And how do you feel Edwinita?

Edwinita: - I didn't help many learners. There are many learners in the class that don't take notice when the teacher speaks, but in cooperative work they made a contribution. They just had to make a contribution.

Sivan: - Which style of teaching, cooperative or traditional made you feel more relaxed?

Candice: - With cooperative I was most relaxed.

Sivan: - Can you give a reason?

Candice: - You had to do your own research and report back. The learners in your group helped you and this gave you more confidence to help others and approach your own work. With traditional, you just wrote down and the teacher spoke alone.

Edwinita: - For me also cooperative. In traditional when the teacher stood in front and spoke, I became bored. In cooperative I had to contribute.

Sivan: - You say you became bored. Many learners also speak of feeling sleepy in the traditional style.

Both: - Yes Sir.

Sivan: - Was it the same for cooperative learning and if not, why not?

Candice: - No, you were never bored with cooperative. There was always something to do, we always worked. You had to compare your answers with the other's.

Edwinita: - With cooperative you can't get bored because there is always something to do. With traditional the teacher stood and spoke and you don't take notice. The learners just sit back.

Sivan: - Do you mean that the learners were passive?

Both: - Yes Sir.

Sivan: - Were you also passive with cooperative work?

Both: - No Sir.

Sivan: - What were you?

Edwinita: - More self confidence in yourself.

Sivan: - Do you mean more active?

Both: - Yes Sir.

Sivan: Were you a participant in the work?

Both: - Yes Sir.

Sivan: - Did you enjoy being a participant?

Candice: - Yes Sir, I enjoyed it very much.

Sivan: - Cooperative work give you the opportunity to talk about many things, especially on a Monday. Did you perhaps enjoy talking about other things, the weekends happenings, or did you enjoy it to work in?

Candice: - It was nice to your work and not to talk about other things. You had to work. The teacher asked you to focus on certain things and came around to check on us and asked our opinions. Thus we could not talk about other things.

Edwinita: - Yes Sir, it was better to work. The teacher was strict and came to check on what we were talking about. We had to then explain to her.

Sivan: - Edwinita, did you ever talk about other things?

Edwinita: - Yes Sir.

Sivan: - And did you enjoy this chance to talk about your own issues?

Edwinita: - Yes Sir.

Sivan: - What did you do when you had a problem in your group, say someone did not want to cooperate?

Edwinita: - We told her it was for her own good and that if she did not participate, it would be her loss.

Sivan: - So you tried to convince her to work?

Edwinita: - Yes Sir.

Sivan: - Can you name a few things that you might have told her?

Edwinita: - We told her that if she wanted to pass, she must work.

Candice: - I became frustrated if someone did not want to work, but I thought why must I, so I worked. Cooperative learning helped us to do well in the exams. We did encourage her to work.

Sivan: - Did you ever tell someone that they are depriving you if they don't work?

Both: - Yes Sir.

Sivan: - Did it work?

Candice: - Yes, we encouraged them. There was one that decided to stop and told others that she was now going to start working and not worry with them if they don't want to work.

Sivan: - There must be things that you did not like about cooperative work. What type of things did you not like?

Edwinita: - If the teacher leaves the room, learners play and scream. We then don't complete our work.

Candice: - If the teacher gives us a task, some learners misbehave and then we can't complete it.

Sivan: - What other things?

Candice: - One shouts at the other if the teacher is out and disrupts the whole class.

Sivan: - Was it the same when the teacher was present in the class?

Edwinita: - No, then there is order and cooperation.

Sivan: - So you did not like it if the teacher left the room?

Candice: - Yes Sir, absenteeism was also a problem, and sometimes through absenteeism work was left for the next day.

Sivan: - Were there people who were shy to talk in class?

Both: - Yes Sir.

Edwinita: - There were two learners that did not want talk especially when the teacher was in class. We told the teacher and she advised the girls that it was in their best interest to cooperate. Hereafter they participated.

Sivan: - Were there any other problems?

Both: - Silence.

Sivan: - Name some of the things you liked about cooperative learning.

Candice: - Sir, that everyone gave their cooperation. That everyone had confidence in herself and wanted to work. Cooperative work helped us with our confidence.

Edwinita: - More insight into the work. It let us expand on our work as each one had to go home and do some investigating. The following day we would put it all together.

Candice: - Learners got to know each other better in the groups.

Both: - Communication was better with each other.

Edwinita: - The fact that we could stand on our own and decide to do that particular thing gave us more self confidence to do the work.

Candice: - Sometimes even if the teacher did not ask us to do something, we worked ahead on our own. That's basically all.

Sivan: - Do you think cooperative work was introduced just to keep you busy, or was it good for doing work?

Candice: - No, I found cooperative better. It was real work.

Edwinita: - Basically the same for me.

Sivan: - Were you ever scared or shy to ask questions?

Edwinita: - Yes sometimes. There were some failures in the group. I was scared of them. They were like bullies.

Candice: - No I was not scared. If I did not understand something, I asked other in the group. We helped each other. If we could not we asked the teacher.

Sivan: - Many learners say they will only ask the teacher to explain something once, but will ask their group mates repeatedly if they don't understand. Did you also experience this?

Candice: - Yes. We ask each other like that.

Sivan: - Do you think the work was more or less for you? Did cooperative work make it easier for you.

Candice: - Yes sir, the working out of questions helped to prepare for tests and exams.

Edwinita: - It was more work, but we worked at home as well. The work was easier and more interesting.

Sivan: - This style of working questions out, did it help you?

Edwinita: - Yes, we had to look up the answers in our textbooks. In the traditional way, the teacher just mentioned things and the summary was on the board.

Candice: - With the traditional you just copied the summary from the board and only learned for exams.

Sivan: - Do you think that the working out of questions had helped you?

Both: - Yes Sir.

Edwinita: - Near exams when you study, it comes to you that you already did something before. The answers come quicker to you. With cooperative you are always busy looking things up.

Sivan: - Did you build up more self confidence with cooperative work? If so why?

Candice: - I became very confident especially in biology. In other subjects I was scared to ask something or to talk, but with cooperative work I was more confident.

Edwinita: - I also say yes, because we are always so scared to speak to the Teacher but with cooperative work it changed.

Sivan: - Did you respect other opinions when you worked in the group?

Edwinita: - Yes, that's the way they feel about the work.

Candice: - Yes, I can't force them to make their answers the same as mine. Maybe they do not feel as I do.

Sivan: - So you did respect other opinions?

Both: - Yes.

Sivan: - But what did you do when your answers differed?

Candice: - After we worked out the work and discussed it, the teacher asked someone for their answer and after this we all corrected our work. We also checked in the textbook to come to the correct answer.

Sivan: - Edwinita, what was the first thing you did when your answers differed? Did you first call the teacher, or did you discuss it or did you try and look up the answer again?

Edwinita: - We first discussed and also looked it up. If we still differed we asked the teacher for help.

Sivan: -So you did not first ask the teacher?

Both: - No Sir.

Candice: - First worked on our own.

Sivan: - Okay. I'm happy for that.

Do you think you would have understood the work better this year if you

only had traditional teaching?

Candice: - No Sir. Cooperative was the best so far. This year it was better because in the traditional, the teacher would be explaining alone and then you have to study hard on the eve of the exam and you may fail because you were lazy to open your books.

Sivan: - Are you saying that cooperative work made you less lazy because with traditional you only want to study for exams?

Both: - Yes Sir.

Sivan: - Do you remember at the end of the first term, we did away with the expert groups and the teacher then gave a summary at the end of a unit? Did this help you, and if so how?

Edwinita: - Yes, it was good.

Candice: - I agree.

Sivan: - Why did it help?

Edwinita: - No Sir, let's say the teacher asked again, then it was not necessary to take your books , er...

Candice: - (completes the sentence) and study because you already did it.

Sivan: - Did it help to ensure that your answers were correct?

Both: - Yes Sir.

Sivan: - So you think it was good?

Both: - Yes Sir.

Sivan: - Would you like to use cooperative learning in other subjects too?

Candice: - Yes.

Sivan: - Like which subjects?

Candice: - History. Study subjects like Biology is one. Business Economics, Biblical Studies and History.

Sivan: - And you Edwinita?

Edwinita: - Yes Sir, I would like to do all my subjects with cooperative learning.

Sivan:- So you want to continue with cooperative learning in standard 9?

Both: - Yes Sir.

Candice: - As I have heard it is a lot of work in standard 9 and also more difficult. Cooperative work will divide the work, it might look more for

others, but for me it is less. It will help me.

Sivan: - What did you dislike about traditional teaching?

Edwinita: - The times that the teacher wrote on the board. You just sat back and thought about other things, your mind is somewhere else.

Sivan: - Name other things.

Candice: - You feel sleepy and bored. You hope that someone can come and call you out of the class as it is uninteresting.

Sivan: - So you say it was uninteresting and your mind wandered?

Both: - Yes Sir.

Candice: - You write down hastily. You do not understand the work. When the teacher explains you do not worry or listen, but when it comes time for the exam, you realise that you would have found it easier if you listened to the teacher.

Sivan: - So you are actually talking about the attention you paid.

Both: - Yes Sir.

Sivan: - What are you actually saying about paying attention?

Edwinita: - With traditional Sir, you don't pay attention but just sit back.

Candice: - With cooperative work you had to work because it was your own work and you had to understand.

Sivan:- Did you wait for the bell to ring during traditional teaching?

Both: - Yes Sir.

Sivan: - And with cooperative work?

Candice: - You hope that the time does not pass quickly as you want to complete the work. Sometimes we do not finish, you want to complete the work the same day.

Sivan: - How did you find the teacher during cooperative work? Did you find that you got to know the teacher better? Was she perhaps more relaxed during cooperative work?

Edwinita: - In cooperative work we spoke more to the teacher. In traditional work we were always so scared for teacher. With cooperative work we were more confident with the teacher and she had more confidence in us.

Sivan: - Okay, Candice.

Candice: - Sir, After a traditional lesson, sometimes the teacher and I are talking, then she may throw a piece of chalk because she wants our attention to be with her. With cooperative learning she has more confidence in us and she got to know us better.

Sivan: - With which style of teaching did you prefer the teacher?

Both: - Cooperative Sir.

Sivan: - Did you enjoy the interaction, the fact that you were active and not just sitting back?

Candice: - Yes Sir, it is better.

Sivan: - Many of you say that you understand better during cooperative work, what made you understand better?

Edwinita: - When we had to work in groups. When you work in groups you had to make a contribution.

Candice: - And I preferred Sir, to work out all the questions given. If you work out all the questions you understand better and not focus only on one part.

Sivan: - Besides being active, what about your discussing in groups, that you prepared? Did this help?

Candice: - Discussion helped us, because if you want to discuss you had to look up the work in the textbook as you cannot just say anything. So, discussion played a major role.

Sivan: - Candice already told me that she prefers to work out all the questions, and not only one as in the expert group, how do you feel Edwinita?

Edwinita: - I also thought it to be better, because in the expert group you only concentrate on the one question. It's better to do all and see who has the correct answer when we get together.

Sivan: - What can your teacher and I still do to improve on cooperative work?

Candice: - I have nothing to say Sir, because the way it was done was better. There is nothing to add.

Edwinita: - I just think Sir that you must go on with cooperative learning, for next year's learners.

Sivan: - What do you think about your leadership. Were you given a chance to improve your leadership role?

Edwinita: - Yes Sir.

Sivan: - Why do you say so?

Candice: - Because Sir, as already mentioned, with other teachers you are scared to talk. Those who were shy before could now ask questions freely in their groups.

Sivan: - Do you feel that you were more in control with cooperative work?

Edwinita: - Yes Sir.

Sivan: - And was it better for you to be in control?

Both: - Yes Sir.

Sivan: - What was better about it?

Edwinita: - It made you learn and if you learn you will be successful. It made you more successful.

Sivan: - And you Candice?

Candice: - As I already said. It will help with exam purposes, because then you don't have to still learn a lot of work later.

Sivan: - Do you think that cooperative work has aroused you to work more on your own now?

Both: - Yes Sir.

Sivan: - So, did it make you more responsible?

Both: - Yes Sir.

Sivan: - Why did it make you more responsible?

Candice: - Sometimes, even before the teacher got to certain work, I already worked ahead on questions. Sometimes just in pencil and it helped me.

Sivan: - And you Edwinita?

Edwinita: - The same Sir. In traditional work we wait for the teacher, in cooperative work we don't have to wait and can carry on.

Sivan: - As I already said, there are no right or wrong answers, but I can see that both of you enjoyed the cooperative work and want to continue with it.

Both: - Yes Sir.

Sivan: - That's all I want to ask. I want to thank you very much for coming in to speak to me about your experience with cooperative work this year. Good luck to both of you for the future.