THE EXPERIENCES, CONSTRAINTS AND CHALLENGES ENCOUNTERED BY A GROUP OF TEACHERS ATTEMPTING TO BECOME TEACHER-RESEARCHERS

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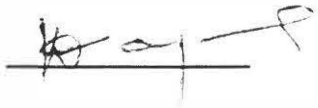
DECLARATION

I wish to declare that the work presented here is original and has not been submitted for any other previous course or in any other university.



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ABSTRACT

The current South African policy documents for teacher education provide reason for hope that, the future may see an increased interest in critical thinking and greater teacher involvement in curriculum development. It is important, therefore, that information be obtained about the conditions necessary for the transition from traditional to critically inclined educational change processes. It is hoped that information from this study will contribute towards that body of knowledge.

Experiences from this study indicate that while teachers may want to become central role players in curriculum development as teacher-researchers, assuming that role requires fundamental changes in their beliefs and assumptions about learning, about teaching and about their own professional development. These beliefs, assumptions and values were the most significant barriers to activities that challenged positivist views which cast teachers into technician roles.

The data indicates that it may be worthwhile to start professional development activities by creating opportunities for teachers to reveal their belief systems. They need not only to bring them to consciousness but, also to critically analyse these values and belief systems. An awareness of the ideas that form part of their common-sense theories could lead to an awareness of the limitations imposed by these theories for improved practice and for self-driven professional development.

The experiences of the teachers who were involved in this study suggest that for teachers to become researchers, they need to have the desire and willingness to assume that role. They also need to recognise research as an essential part of their professional development. They need to identify something meaningful in research and to be able to establish a clear link between research and their practice. Furthermore, teachers need to change their self-image and develop confidence in their own ideas and their abilities to tackle unfamiliar challenges. They need to change their perceptions of research and of who

is best situated to conduct research in the classroom, that is, whether it is the classroom teacher or the university-based educator.

Change turned out to be a highly emotional process, which triggered withdrawal reactions and in some cases rejection. However, those who persisted found the changes they experienced liberating and empowering. Teacher educators and other facilitators of teacher development exercises need to be conscious of the difficulties and anxieties caused by demands for change. They need to be aware of the power issues that play a role in their interactions with teachers. They need to consciously reflect on and monitor their own roles in these interactions.

TABLE OF CONTENTS

DECLARATION i

ACKNOWLEDGEMENTS ii

ABSTRACT iii

TABLE OF CONTENTS v

LIST OF TABLES vi

CHAPTER ONE: INTRODUCTION

1.1 Rationale for the study 1
1.2 Purpose of the study 5
1.3 An Overview of the thesis 6

CHAPTER TWO: LITERATURE REVIEW

1.1 Introduction 8
2.2 Theoretical paradigms in educational inquiry 8
2.3 Teacher-based research, curriculum development and teacher development 27
2.4 The South African Context 36

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Background to the study 53
3.2 Organisation of the research in the three phases 60
3.3 Sources of information 63
3.4 Methodological considerations and methods 70
3.5 Analysing the information gathered 82

CHAPTER FOUR: INSIGHTS FROM THE STUDY

4.1 Introduction 87
4.2 Previous experience with research 88
4.3 Perceptions of the research project 91
4.4 Motivation for participation 100
4.5 Perceptions about research 102
4.6 Perceptions about roles 112
4.7 Experiences and challenges of research processes 120

4.8 Barriers encountered 130
4.9 Changes undergone by the teachers 138
4.10 Reflections on my experiences as a researcher, co-organiser and facilitator 144

CHAPTER FIVE: EMERGING ISSUES AND DISCUSSION

5.1 Introduction 152
5.2 Power barriers 153
5.3 Value barriers 159
5.4 Psychological barriers 168
5.5 Practical barriers 170
5.6 Summary 171

List of References 173

LIST OF TABLES:

Table 1: The relationship between the three paradigms and knowledge-constitutive interests 9

Table 2: The merits and demerits of action research 46

Table 3: Different types of observational studies and settings 77

CHAPTER ONE

INTRODUCTION

1. 1 Rationale for the study

Past practices of curriculum development and teacher development in South Africa were based on beliefs and assumptions that promoted and perpetuated technicist ways of thinking and practising (Ashley, 1989; Macleod, 1995). Teachers have generally been left out of important decision making structures and processes involving their work and the nature of change necessary to improve the quality of teaching and learning (National Education Policy Investigation [NEPI], 1992). Teacher training policies and practices in institutions which produced a large majority of the teaching force were based on theories that did not prepare teachers for self-criticism, self-reflection and collaboration with colleagues to bring about reform and improvement in their classrooms and schools (NEPI, 1992). Their role in research was that of technicians who implement ideas from other people. Where they participated in research, they were subjects of research or at best, informants. The teachers therefore, were largely not exposed to a culture that encourages reflective and critical practice.

The policy documents of the new government portray a shift in beliefs about the nature of pre-service training of teachers and the objectives for such training (Department of National Education: White Paper on Education and Training, 1995; Committee on Teacher Education Policy [COTEP], 1995). The aims for teacher training include that teachers should be equipped to be curriculum developers and to be critical about their work and about broader issues in the society which impact on educational practices (COTEP, 1995). Although these are still at the level of policy, the explicit aims are encouraging, that perhaps a culture of critical inquiry into teaching by teachers may be developed. There is therefore a need to develop an information base of issues involved in

situations where teachers attempt to become reflective practitioners, especially situations where teachers attempt to become researchers.

International examples of teacher research, that is, research conducted by teachers themselves, have demonstrated the potential of teacher research for improved practice and for teachers' self-directed professional development (Atkin, 1992; Elliot, 1991; Hollingsworth and Sockett, 1994; Nixon, 1981). An outstanding question from the international experience is why it is that only some groups of teachers, and not every teacher, are researchers. Why do we not have armies of teacher researchers, who are actively involved in processes of generating knowledge about their practice? These questions necessitate an investigation into the constraints and challenges that face teachers who attempt to become researchers. Such information would provide ideas for supporting such initiatives and for introducing teacher research as the main mode of curriculum development in schools and the professional development of teachers.

Several examples of teacher research in South Africa also offer insights about the possibilities of teacher research as an approach to curriculum development and teacher development (Adler, 1993; Goolam, 1997; Naidoo et al, 1993; Walker, 1990). It seems possible that teacher research, be it action research, or any other type of research carried out by teachers, could provide solutions to some of the educational problems in the country. These local examples, however, are derived from studies based in universities. A SABINET (South African Bibliographic Information Network) search revealed no examples of teachers engaged in research as a result of their own initiative and as part of their daily teaching activities. It is therefore important that initiatives be taken to determine the requirements for research in this country, and to determine the kind of skills and attitudes that teachers need to be able to initiate research activities in their classrooms and their schools. It is also important that efforts be made to determine the implications of a research approach to curriculum development for teachers and for their schools. This is especially important given the way schools are structured and the level of resource availability in schools, especially in underprivileged communities.

In investigating the conditions necessary for teacher research, this researcher is taking a position that teachers need to have autonomy and exercise judgement in their work, rather than become mere functionaries. It is the view of this researcher that if teachers have to develop professionally, this process has to be meaningful to them and needs to be self-directed. Teachers have to take responsibility for their own learning and engineer change processes such that they genuinely address their needs and aspirations. My position is that teacher education programmes should enable teachers to become independent learners and directors of their own development. As a teacher, my experience with in-service training is that unless it empowers teachers to determine for themselves what changes are needed in their classrooms and in their practices, teachers may not really be challenged to re-examine the values, assumptions and beliefs which shape their practice. The result is that as soon as the training programme ends, the teachers revert back to their traditional practices.

I have personally gone through some in-service training that was meant to improve my teaching by increasing efficiency in the classroom. Thinking back to this experience, I now realise that the assumptions underlying the training included that learning is a direct result of teaching and that increased efficiency will lead to improved teaching and learning. This has not necessarily proved to be the case and is at times misleading.

Like many others the INSET programme was not initiated by teachers, and I, like many of my colleagues regarded the programme as external. Since it was pre-designed and represented the interests of mainly the education department and the funders of the project, it never really belonged to us, we did not know where it was heading, and why we were doing certain things and not others. The changes emphasised in the programme did not necessarily address those issues that we considered important for our classrooms. Therefore, as soon as we parted ways with the initiators of the project, we stopped the activities associated with them. We easily reverted back to our old teaching habits. There were few occasions in the programme when we really felt challenged to re-examine the ways we were teaching.

Looking back at this experience has always made me wonder if things would have been different, had we been engaged in that exercise as partners. What would have happened if we had articulated our interest, what we wanted to do and gain from the project, if we had a sense of ownership in this process? I believe, we could have grown more professionally. It is partly in pursuit of these questions that the research focused on teacher research and the ideas behind it. The approach seems to hold a promise that teachers can have an opportunity to direct their own learning by researching issues that interest them and which are relevant to their contexts. The research was therefore an attempt to answer these questions but also to explore the possibilities of teacher research in a situation where teachers engage in research as part of their daily activities and where the teachers learn about research as they try to do it. The specific research questions which guided the study were:

1. What processes do teachers have to go through in order to become researchers?
2. What challenges are they confronted with?
3. What constraints do they encounter?
4. What is the impact of these challenges and constraints on their attempts to do research?

The project reported here attempted to involve teachers in research outside the context of an academic course, and for teachers at different levels of education, from primary to high school levels. The view of the IPEB co-ordinator of the project was that, although teacher research may potentially improved classroom activities more than traditional methods, there is not enough information about issues which relate to how it can be supported and sustained, nor about the challenges and constraints encountered in such processes. It was felt that it is important to investigate the factors that enhance teacher research so that these can be further developed and to determine those factors that hinder teacher research, so that an effort can be made to eliminate or minimise these constraints.

The decision to investigate these issues was also a result of a realisation that, although political changes may transform the broader structures in society, the positions of teachers

in educational hierarchies, and the degree to which teachers can be afforded opportunities to have significant decision making powers about their work, is not guaranteed to change for the better. It was also a result of a realisation that classroom practice may remain largely unchanged and that teachers need to be assisted to become change agents engaged in research processes to change their own classrooms.

The research project served as a venue for processes of knowledge generation for all participants, teachers and facilitators alike. The intention of the project was that the generation of knowledge would occur in and through action as the different participants engaged in research activities. There would be enlightenment for teachers as they grappled with the implications of a research stance to teaching and professional development. There would also be enlightenment for non-teaching participants, such as myself, as they grappled with issues relating to the facilitation of teacher research in a participatory context.

1.2 Purpose of the study and methods used

The intention of the study was to contribute to the body of knowledge about teacher research and the issues surrounding it, including the challenges it poses for teachers and the mechanisms and support structures that are required to support and sustain it. The intention of the research was also to expose the teacher's perceptions, beliefs and assumptions about teaching and learning, about research and about their role in research and educational change in general. The findings will be of interest to the teachers themselves and will have implications for curriculum development policy and teacher training policy, both at pre-service and in-service stages.

The methods employed were:

- participant observation,
- interviews,
- questionnaires,

- audio-taping and video-taping,
- keeping a reflective diary,
- keeping written records of meetings, workshops and other discussion sessions.

1.3 An overview of the thesis

Chapter two provides a literature review in which three paradigms which shape educational activities and approaches to inquiry are outlined and discussed. These paradigms are the empirical-analytic, the symbolic and the critical paradigms. The discussion of these paradigms attempts to highlight how, depending on the theoretical orientation of the curriculum development activities, teachers can either be relegated to mere functionaries who implement other peoples ideas or given more critical perspectives, how teachers can become masters of their own game who design, implement and evaluate their own work and their own development. Teacher research is presented as an alternative to traditional modes of curriculum development and teacher development. Examples of teacher-research derived from both international and local contexts are used to highlight the potential of teacher research for curriculum development. The chapter also provides a discussion of issues that need to be dealt with when teachers are encouraged to engage in research activities. A discussion of past and present ideologies which influence educational policy and practices in South Africa is provided and linked to teacher training and the extent to which such training prepared teachers to be reflective practitioners and researchers of their own work.

In chapter three, the project in which the study was conducted is described and specific features which assisted the research included. The chapter is also a description of the methodology adopted as well as the techniques used for data collection. The places and activities that served as venues for the research are also described.

In chapter four, the findings of the study are presented, showing the experiences of the teachers as they attempted to engage in research and to change their roles in teaching and

learning situations. The chapter also provides a discussion of factors which had an impact on the teachers' attempts to become researchers. These include prior experience with research, motivation to engage in research and in professional development activities, perceptions and expectations of research and the implications that research has for teachers. In this chapter factors which presented themselves as challenges and constraints to teacher research are also presented.

A description of some of the changes undergone by the teachers is provided to illustrate the impact that the inquiry approach had on the teacher's practices and on their self image. Lastly the experiences of the researcher are provided showing how the type of initiation into research affected this research. This section also provides an account of the experiences of the researcher as a facilitator of teacher's research activities and as a learning researcher.

The last chapter is a discussion of the issues emerging from the study. In this chapter the researcher highlights some of the barriers and difficulties that were experienced by the teachers, the organisers and other people who facilitated activities in the science camp and in the project as a whole. Drawing on Dalin (1978) the barriers are classified as power barriers, value barriers, psychological barriers, and practical barriers. An attempt is also made to relate the issues to the paradigms discussed in chapter two.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In this chapter a brief overview of three paradigms that shape educational activities and the role of teachers in these activities is provided. The paradigms discussed are, an empirical-analytic paradigm, symbolic sciences and critical sciences paradigm. The fundamental human interests which form the basis of these paradigms are provided along with a discussion of how each interest affects views of social life and social phenomena, including educational practices, curriculum development, educational research and the nature of teacher involvement in such research endeavours. Teacher-research is presented as an alternative to traditional, especially technicist, forms of curriculum development and teacher development. The discussion includes the possibilities of teacher research and some of the issues that need to be taken into consideration as teachers are encouraged to undertake research into their own practices.

The chapter also outlines ideologies which have shaped educational practices in South Africa. The discussion of ideologies includes a review of how these ideologies have affected curriculum development and teacher training. Examples of alternatives within other paradigms which employ teacher-based research are explored with special emphasis on the potential of teacher research for solving educational problems in the country.

2.2 Paradigms in education

Educational practices and educational change, being social phenomena, are influenced and shaped by values, assumptions, beliefs and ideas of the people involved in such practices and change processes. Guba (1990:17) describes a paradigm as a "basic set of beliefs that guide action, whether of the everyday garden variety or action taken in connection with a

disciplined inquiry". In order to develop an understanding of the different roles that teachers can play in curriculum development and in their own professional development, it is important to explore the sets of beliefs that have shaped such practices. In a study aimed at exploring issues that play a role as teachers attempt to become researchers of their own practice, it is important to have a look at the beliefs that have determined their role in research in the past and to explore alternatives that have a more empowering potential for teachers.

Popkewitz (1984) identifies three paradigms that have emerged to define and structure educational theories and educational inquiry. These are an empirical-analytical paradigm, a symbolic paradigm and a critical sciences paradigm. These paradigms are differentiated on the basis of the assumptions inherent in them, their views of social life and the human interests that they serve. "Interests in this sense refers to generally the fundamental orientations of the human species" (Grundy, 1987:9). These interests influence how knowledge is 'constituted' or constructed (Grundy, 1987). These interests are the technical, the practical and the emancipatory interests. The relationship between these interests and the three paradigms identified by Popkewitz (1984) is represented in table 1.

Table 1: The relationship between the three paradigms and the knowledge-constitutive interests

INTEREST	KNOWLEDGE	PARADIGM
Technical	instrumental (causal explanation)	Empirical-analytic or natural paradigm
Practical	practical	Hermeneutic or Interpretive (Symbolic paradigm)
Emancipatory	emancipatory (reflection)	Critical paradigm

(adapted from Carr and Kemmis, 1986:136).

2.2.1 The Empirical-Analytic Paradigm

This paradigm is also known as the positivist/empiricist approach (Scott & Usher, 1996). It is a view of social life that shares a number of assumptions with the natural scientific approach to reality and to the nature of knowledge. In this view the social world exists as a system of variables which are distinct and analytically separate. The relationship between the variables is seen in terms of how one variable causes another, that is, causation is of the type, "if X occurs, then Y will be the effect" (Popkewitz, 1984). Examples of this type of causation in education can be found in such educational ideas as those that emphasise certain types of motivation designed to elicit pre-determined behaviour in pupils.

The empirical-analytic or positivist/empiricist approach to social life is informed by a technical interest, which is an orientation towards controlling and managing the environment. To achieve the aims of control and manipulation of the environment, knowledge is often produced through experimentation and is structured in the form of generalisations and laws that have predictive powers and which, therefore, can determine the future. The validity of this knowledge is based on empirical evidence and observations and draws heavily on manipulation of statistical data.

In this view, theory is regarded as universal and applicable to all situations. Theory is treated as immune to values operating in the context of the social act or the educational practices. Those located in this paradigm, make arguments for a distinction between facts and values. An underlying assumption of this view of the relationship between values and facts is that knowledge, and the facts that constitute knowledge, are independent of the values which people have within a given situation. In other words, the relationship between the knower and the known or the knowable is one of disinterest and distance.

In the empirical-analytic paradigm, action is determined by and guided by theoretical specifications. The relationship between theory and practice is such that theory determines the nature of practice, as well as the outcomes of such practice. Practice on the other hand

becomes an application of theory and the use of skill to produce pre-specified outcomes. Thus action is product-oriented. The technical interest gives rise to an instrumental action (Grundy, 1987), which is governed by specific rules that serve controlling purposes. Evaluation of the practice is an assessment of the extent to which the product is a reflection of the theoretical ideas guiding it. The extent to which the product mirrors the guiding ideas is regarded as dependent on the skill of the practitioner. Change in this view, is therefore a process of perfecting the art of producing outcomes that mirror exactly the underlying ideas to change.

In educational settings, the technical interest leads to perspectives that emphasise control and promote unequal power structures between people who posses certain types of knowledge and others who don't. It provides justification for hierarchies and unequal distribution of power at all levels of the education system. For example, the hierarchical relationship between institutions of learning and the people in them. Tertiary institutions are regarded as the fountains of knowledge and are placed at the top of education power structures, while schools and teachers are positioned lower down in the structure. This view also encourages unequal distribution of power in decision-making structures and processes. In the classroom, it bestows power on the teacher while the students become subjects of control and manipulation.

Another consequence of technicist views is fragmentation of curriculum development processes. Curriculum design, implementation, evaluation and development processes are treated as distinct, happening at different sites and at different moments. Only implementation has the classroom as the site of operation. The design, evaluation and development phases are considered external to the act of teaching. Even if the original educational ideas came from the teacher. "Once the design process is completed, the plan becomes external...[and] has an authority which is separate from the person of the designer" (Grundy, 1987:32).

This separation also implies a division of labour which is hierarchical in character. The perceived dominance of theory over practice leads to a hierarchy between curriculum designers and implementors. A hierarchy in which curriculum designers are authorities and teachers are subordinate to this authority. The hierarchical relationship creates a situation where the expertise of curriculum designers bestows powers on them to determine the nature of educational acts as well as the products of the educational acts. Implementation becomes a process in which practitioners exercise their skill and attempt to model students into products envisaged by the curriculum designer. The student on the other hand is viewed as a passive recipient and a willing subject of processes meant to model him to fit the pre-designed product of education.

Another effect of the hierarchical division of labour is the de-skilling and de-valuation of teachers' labour.

> Although the accomplishment of (teaching) skills will ensure the value of teachers work in society, since the teacher does not have ultimate or autonomous control in the design of the curriculum, the curriculum designers can design a curriculum which by-passes or down-plays the pedagogical skill of teachers
>
> (Grundy, 1987:33).

Teaching that is located in the analytic-empirical paradigm becomes a product-oriented activity in which teachers work towards attaining pre-determined objectives. Professional development is concerned with optimising teachers' efficiency. Change for teachers then becomes the improvement of their skills. Their professional competence is measured by the effectiveness of their practices in achieving the outcomes being pursued. As Carr and Kemmis (1986) note,

> the professional expertise of teachers does not derive form any concern with educational values and goals. Rather, it stems from the possession of the technical skills required to apply scientific theories and principles in educational situations...Professional competence, therefore, is judged not by reference to the way in which teachers formulate their aims, but by the

> effectiveness of their practices in achieving whatever aims are being pursued
>
> (Carr and Kemmis, 1986:30).

In the applied scientific view, the purpose of research is to produce scientifically verifiable knowledge that can be used to ensure that pre-determined educational goals are achieved by the most effective means (Carr and Kemmis, 1986). The research emphasises rationality, premised on a belief that there must be convergence on a single explanation for observed phenomena. Research is used to justify generalisations and laws which attempt to provide this convergence in explanation. Research becomes impersonal, as the researcher is supposed to maintain a distance and remain objective during inquiry. The more objective and the less subjective it is, the better the research (Scott & Usher, 1996). Research serves the purpose of generating general principles of behaviour that can be used to explain, predict and control events in educational situations.

One of the premises of research in the empirical-analytic paradigm is a belief in formalised knowledge, so preliminary stages of research involve making clear and precise hypotheses prior to the research. The research process then serves to confirm or falsify the hypotheses. Research in this paradigm tends to be quantitative, as the validity of knowledge generated is based on the frequency of occurrences. There is heavy reliance on mathematical and statistical sources of information. The quantification of phenomena allows for the reduction or elimination of ambiguities and statistical data is utilised as justification for generalisations and the construction of laws.

Researchers pursue questions aimed at solving problems that may limit opportunities for producing the pre-defined product. They include questions that investigate the effectiveness of particular approaches or teaching strategies, and questions that compare the effectiveness of different teaching methods, for instance, determining the relative effectiveness of one method in comparison with another. The findings of such research efforts are meant to provide helpful information for teachers to make practical decisions.

Thus reinforcing the notion of knowledge as generated elsewhere and implemented through the practice of practitioners.

Educational researchers who adopt the applied science view of research attempt to develop methods which avoid intervention by the researcher as much as possible. That is, they attempt to be as distant as possible from the setting and the people in it. If the researcher adopts an experimental approach, intervention in the study is done strictly for purposes of observing the intervention so that the researcher can learn something about the cause-effect relations within the situation. The researcher also maintains a distance between himself and other people in the setting. Their relationship is that of a subject who is studying objects.

The methodology of the empirical-analytic is linear and product-oriented. The methods used include structured interviews and questionnaires administered to a large number of people. The sample population may be divided into two groups, the experimental group and the control group, where the difference between the two is in the variable or variables being tested. These studies tend to be surveys aimed at identifying commonalities. Conflicting information or deviations from the main trend or pattern are corrected for by employing mathematical and statistical techniques.

Carr and Kemmis (1986) highlight several shortcomings of positivist views and positivist approaches to research. Firstly, they challenge and dispute positivist notions of knowledge and argue that these views of knowledge, objectivity and truth lead to research practices that miss out important aspects of social life and generate irrelevant knowledge for many practitioners. Secondly, they argue that inquiry about humanity and human actions is a social phenomena and as such is guided by the ways of thinking and acting regarded as appropriate within the setting in which it is conducted. These ways of thinking and acting are based on a range of complex beliefs, values and assumptions. Therefore theories backed by research findings cannot be value-free and universal to all situations. In addition to these criticisms, Ary et al (1990) point out that there is often a lack of agreement

among researchers in the social sciences as to what the established facts or theories are and what explanations are satisfactory for the assumed theories.

Ary et al (1990) further point out that in dealing with human subjects, there are so many variables, acting independently and in complex interaction, which must be considered. Furthermore, each individual in the setting is "unique in the way she develops, in mental equipment, in social and emotional behaviour and in the total personality" (Ary et al, 1990:20). They also highlight that in social settings, in addition to individual differences, the behaviour of humans in groups must be dealt with. Therefore, it is very difficult to make generalisations about the setting, about the individuals in it, and to consider their behaviour as characteristic of all people in group settings. If generalisations are made, this has to be done cautiously as data obtained in one setting may not be valid for other groups and other settings.

Another criticism relates to the role of the researcher in the setting under investigation. Ary et al (1990) argue that in social sciences observations are more subjective because they frequently involve interpretation by observers. The investigators are also human beings and their presence as observers in a situation may change the behaviour of their human subjects. The researcher is therefore interacting with other people in the setting, by merely being in it. Claims that the researcher can maintain a non-interactive stance and remain at an unchanging distance from the research subjects are misleading.

2.2.2 The Symbolic Sciences Paradigm

The second paradigm described by Popkewitz (1984) is the symbolic sciences paradigm, also known as an Interpretive paradigm. The view of social life adopted in this paradigm is that it is created and sustained through symbolic interactions and patterns of conduct. One of the basic assumptions of this paradigm is that all human action is meaningful and that it has to be understood and interpreted within the context in which the action takes place. Context is therefore more important than concerns with universality and generalisation.

Symbolic approaches are informed by a practical interest. This is an orientation towards understanding the environment, in order to interact with it, as opposed to competing with it. It is an interest that leads to moral decisions and leads practitioners to be concerned with taking the right action within a particular setting. Decisions about what is right as opposed to wrong, and what is good rather than bad, are made by all participants in the social act. A practitioner informed by a practical interest views knowledge as subjective and recognises the need for agreement about what qualifies as valid knowledge. The possession of certain types of knowledge thus ceases to provide justification for unequal power distribution.

A practically-oriented approach to knowledge implies a different relationship between the knower and the known and between fact and value. In the interpretive paradigm it is acknowledged that people come into deliberation with values and opinions and these have a bearing on what is validated as knowledge. Knowledge is accepted as value-laden rather than immune to human factors. It cannot be separate from the knower and theory cannot be an authority over the knower. A practically-oriented approach values individual judgement and understanding. Understanding is given more importance than observation geared towards generalisation. Deliberating groups cannot be told what the truth is, they reach consensus about an interpretation of reality that is best for them, at the particular time in history. By making knowledge subjective, the views of all participants interacting become subject to debate and critique.

Practical action is a culmination of deliberation, and a desire to understand or make meaning of a situation. It is action by the practitioners, based on their perception of what needs to be done, rather than a result of pre-specified objectives. The judgement of the practitioner is a valuable aspect of the action taken. Theory is also not a rigid guiding framework for practice. It is tested through practice during the processes of deliberation and reflection and these processes are influenced by the practical knowledge that the deliberating persons have. Individual autonomy is much more valued and principles of

democracy and equality are encouraged by advocates of interpretive approaches. Thus, the practical interest gives back some degree of decision making power to the practitioner.

The practical view of education is different from the instrumental and reproductive perception of technical approaches. Education is seen, as,

> essentially a process or an activity. It takes place in social situations of great complexity, calling for many decisions from those involved... educational processes cannot be viewed as means-ends systems, with clear and definite ends and alternative means (techniques) to achieve them
>
> (Carr & Kemmis, 1986:36).

A practical interest in curriculum therefore places emphasis on the processes of education, the actions of practitioners and other members of learning communities, rather than upon some pre-defined product. The processes of design, implementation, evaluation and development cease to be separate and they are instead supposed to be done concurrently as a practical act. That is, an act of interpretation and meaning-making. Stenhouse (1975) argues that curricula informed by interests other than the technical, should not be a package of materials or ground of syllabus to be covered and that educational ideas should be expressed as specifications, subject to testing by teachers. By so doing, equality between the proposer and those who assess his or her proposal could be achieved, as well as equality between the education planner and the teacher. In this way, practical views shift from the promotion of hierarchies built on the basis of knowledge and expertise, and instead recognise teachers as important stakeholders in curriculum decision-making. Teachers cease to be technicians who do not need to understand the rationale behind the material that they teach.

In the classroom, the practical orientation necessitates negotiation and consensual agreement between the teacher and the students. The teacher has a responsibility to recognise learners as subjects who possess views and experiences that deserve recognition and deserve to be deliberated. This view, therefore, offers opportunities for learners to

become important participants in the making of decisions about what constitutes meaningful learning. Those oriented towards the practical recognise that the "right of each subject to determine meaning to the extent of his/her capabilities is an important principle to be safe guarded" (Grundy, 1987:66).

The teacher informed by a practical view will be a facilitator of learning, rather than an expert who leads students to pre-determined ends. His practice would place emphasis on learning rather than teaching. S/he would be much more interested in developing understanding in students than in recall and rote learning. Such a teacher would reject right or wrong types of questions. For instance a mathematics teacher predisposed towards the practical would reject curriculum proposals encouraging the achievement of correct answers as a result of applying appropriate algorithms, without an understanding of the underlying principles.

The evaluation of practically-oriented curriculum constructions shifts from a focus on the extent to which products mirror original ideas. Instead evaluation is not a separate process from learning. Teachers and students are both involved in evaluating the learning experience. With regard to the assessment of children's learning, Stenhouse (1975) points out that the teacher is a critic, not a marker. "The task of appraisal is that of improving students' capacity...by critical reaction to work done... the teacher's role in assessment is to promote learning of self-assessment by critiquing work done" (Stenhouse, 1975:95).

So, critical comment becomes more important than a grade. However, Stenhouse (1975) warns that the emphasis on critique rather than a mark is also a weakness of process models in that, the abilities of students depend on the judgement of individual teachers. Therefore, the feedback to one's work will vary from teacher to teacher. If a student does not trust the judgement of a particular teacher, the student may want marking rather than criticism. To succeed, this type of evaluation requires that both the teacher and students agree to work towards self assessment rather than grading.

Stenhouse (1975) describes some of the demands posed by the practically-oriented process model of curriculum development for the teacher. For instance, the teacher has to choose between being an expert or a learner along with students. In most cases the teacher has to cast himself in the role of a learner, a role that dictates different teaching methods, such as discovery and inquiry methods, rather than instruction. Furthermore, the teacher, being a senior learner needs to develop skills of finding things out so that he can make worthwhile offers to the junior learners, his/her students. Through the exercise of judgement, increased wisdom and increased scholarship of the teacher, the process approach to curriculum development also becomes a means of bettering the personal and professional qualities of teachers. The process model is thus committed to teacher development.

Educational research guided by a practical interest focuses on human interaction and how social settings are created and governed. Curriculum research focuses on the interaction between students and teachers and attempts to make meaning of the factors at play in the teaching and learning situation. The researcher aims at understanding the situation rather than controlling different variables in it to achieve pre-defined goals. Neither does he aim to test pre-defined hypotheses. Research in this paradigm depends less than that in the empirical-analytic paradigm on mathematics and the manipulation of experimental variables. Rather than breaking down action into small and manageable parts to experiment with and analyse, research based on the practical interest deals with action in a more holistic fashion. The researcher does not gather exclusive information on specific variables, but rather learns everything about the people, their interactions with each other and the environment in which they interact. The interpretive researcher aims at understanding situations rather than measuring some elements of the situation. Questions asked in interpretive studies are of the nature, "what is happening here...what do these actions mean for the actors involved in them, at the moment the actions take place" (Wittrock, 1986:120). The relationship between the researcher and others in the setting is one of interaction rather than that of an expert and objects of study.

Research methods employed by interpretive researchers include participant observation, semi-structured and unstructured interviews and case studies. Interpretive studies also tend to be qualitative, focusing on the quality of social events rather than measuring the frequency with which they occur. In some cases both qualitative and quantitative techniques are employed so that the researcher may have an understanding of what is happening in a situation and then use the frequency of the occurrences to determine the significance of a particular incidence in a given community. Samples tend to be small so that observations can be specific and detailed. As they regard individuals and communities as entities in their own right, interpretive researchers avoid unnecessary generalisation. They incorporate differences, rather than correct for them. Data may be captured in a descriptive manner in writing and or taped so that the situation may be replayed and interpreted later.

While interpretive researchers may adopt participatory approaches, they exercise caution about the degree to which their presence influences the setting. Interpretive researchers also tend to regard understanding rather than change as the immediate and direct aim of the research. In situations where researchers collaborate with teachers, the teachers' role is that of a co-operator with the researcher in the pursuit of knowledge. Important decisions about why the research needs to be done, about the questions to be asked, the methods to be used and the fate of the findings are made by the researcher, not the teachers. The roles of researcher and teacher remain separate and are assumed by different people. The teacher therefore does not own the process and cannot control it or the usage of its findings. The research process may not necessarily result in enhanced professional development of the teacher. Even if this happens it is not self-directed and self-monitored and may not equip teachers with skills for on-going renewal and on-going development.

2.2.3 The Critical Sciences Paradigm

The critical view of social life is a response and an alternative to shortcomings in both the empirical and the symbolic sciences paradigms. It differs from the empirical-analytic in that theory is not prescriptive and does not determine the nature and the outcomes of action. The practically-oriented approaches on the other hand are limited in that they adopt liberal tendencies that protect and nourish individuals without challenging social and political structures that operate to structure individuals in society (Carr & Kemmis, 1986). Practical approaches also fail to recognise that subjective meanings that characterise social life are themselves conditioned by an objective context which limits both the scope of individual intentions and the possibility of their realisation. Drawing on Habermas, Carr and Kemmis (1986) argue that, while the interpretive views provide useful approaches, they are nevertheless inadequate as a basis for social science. They present an alternative derived from Habermas' argument that, "there is a basic human interest in rational autonomy and freedom which issues in a demand for the intellectual and material conditions in which non-alienated communication and interaction can occur" (in Carr and Kemmis, 1986:135).

This is the emancipatory interest and it is an orientation towards freedom, where freedom is sought and attained by the disempowered themselves. An emancipatory interest thus rejects power structures that empower and privileges some people at the expense of others. Emancipatory activities are inherently participatory, collaborative and geared towards improvement in social and political contexts.

The key concepts in the critical paradigm are enlightenment, empowerment and emancipation. Enlightenment refers to the shared perception with the symbolic, that knowledge is subjective and historically located, and that individuals and communities need to deliberate and reflect on their circumstances. Those inclined towards the critical view go further to say that individuals must also be aware that what they agree on, the understanding they come to, is affected by the social and political structures within which

they operate. Therefore, the understanding may be a distortion and may be masking important political issues. The critical view therefore is based on arguments that reflection should include a critique of political factors that operate to disempower people. People should not just deliberate, they should be empowered by the knowledge they generate, and they should emancipate themselves from the confines of myths that operate on them to perpetrate oppressive and disempowering practices and structures.

In comparison to the symbolic practice of self-reflection geared towards understanding, those informed by critical views take the position that the process of enlightenment is not final, it is a stepping stone towards action. It is a preliminary stage to action which challenges both the social and political conditions. The critical paradigm and actions located within it are thus inherently political.

> A critical science investigates the dynamics of social change, of past and present, to unmask the structural constraints and contradictions that exist in a determinant society
>
> (Popkewitz, 1984:47).

Emancipatory actions are based on an integration between theory and practice. This happens through reflective and practical moments in a dialectical process of reflection, enlightenment and political struggle carried out by groups for the purpose of their own emancipation. Action can draw from theory for information but not direction. It is a result of and leads to theoretical and practical deliberation.

Those inclined towards the critical view challenge the power distribution patterns emerging from the way positivists view the relationship between knowledge and authority, and between knowledge and power. In critically oriented approaches, knowledge is regarded as subjective and subject to validation and authentication by the people involved in its construction and use. The critical view regards knowledge as socially constructed and subject to change. What qualifies as knowledge at a particular historical moment and

in a specific context, may not maintain the same status at another time and in another place.

In education, the focus of critical perspectives is on practitioners and learners and espouses principles of autonomy, empowerment and liberation for both learners and teachers. The critical view further challenges the power structures in society which have created fixed roles, reproduced by both the technical and the interpretive approaches. The purpose of education is seen as bringing about transformation and emancipation. Educational change comprises of process where all stakeholders are involved in critical reflection and critical analysis, with a view of transforming and improving educational practices and the contexts in which they occur. For instance, in a school transformation programme, the teachers, the students and the administrators participate in deliberation and critical analysis of the situation and together they actively engage in transformation. Reform is also aimed at the transformation of, "educational understandings and educational values of those involved in the process and the social and institutional structures which provide frameworks for their action" (Carr and Kemmis, 1987:156).

Freire and Shor (1987) term the education with an emancipatory interest, "Liberation Education" and its classroom the "liberating classroom". They call the teacher engaged in dialogue for change a dialogic teacher and a liberating educator. While traditional settings permit that the teacher maintains authority and empowers the teacher to be active while learners are reactive, an emancipatory teacher has to assume a different role. In a liberating classroom, the teacher ceases to be an expert and relinquishes the role of director of student's learning. The teacher-student contradiction is resolved. The teacher is not the only one who teaches and students are not the only ones who learn (Freire and Shor, 1987).

While the teacher cannot stop being an authority or having authority, s/he needs to be aware that authority is founded in principles of freedom and democracy (Freire and Shor, 1987). Therefore, the teachers' authority must not be transformed into authoritarianism,

because such teachers limit the freedom of learners and undermine emancipatory educational goals. "Authority needs to know that it has its foundations in the freedom of the others...if authority denies this freedom and cuts off this relationship, the founding relationship with freedom, then it is no longer authority, but authoritarianism" (Freire and Shor, 1987:91).

Freire and Shor (1987) also point out that it is important to acknowledge differences that exist between the teacher and students, and they argue that to deny the differences would be hypocritical. The teachers are different from their learners in terms of their experience with the subject material presented to learners. "The dialogic teacher is more intellectually developed, more practised in critical scrutiny and more committed to a political dream of social change, than are the students...the teacher is different, not only by virtue of his/her training, but also because the teacher leads a transformation that will not happen in class by itself". (Freire & Shor, 1987:95)

The knowledge that teachers possess is not their exclusive possession. Although the teacher, by selecting objects of study, knows them better, as the students' learning occurs and through the interaction with the learners, s/he re-learns the objects of the study. The ability of the educator to know the objects under study is remade every time through the students own ability for knowing (Freire and Shor, 1987). Therefore, possession of knowledge need not be used to justify authoritarianism and the perpetuation of inequality.

Curriculum research questions will not just be concerned with the nature of educational ideas and curriculum activities, but also questions relating to ways in which education is being instrumental to serve the interests of those in power and how power redistribution can be achieved during and through the practice of education. Practitioners will constantly scrutinise their activities to find out how their own practices address the emancipatory needs of all role players in educational processes. Research concerns include questions relating to why things are the way they are, not just what knowledge is taught, but also why that knowledge is important, why a particular action is taken and how educational

situations and events can be changed to bring about an improved democratic future. A critically-oriented researcher will be driven by ideas of liberation. The research process will continuously be reflected upon by participants in it, to determine the extent to which it operates to emancipate the participants.

An educational researcher informed by critical ideas therefore, does not aim at studying teachers. Neither does s/he aim at just developing an understanding of teaching and learning situations and describing interactions in those situations. The researcher collaborates with other participants in the setting, as change agents working together for the transformation of situations which disempower them. The researcher aims at assisting the teachers to study their own lives and in the process take control of their own lives. Such a researcher cannot study a social situation from outside, but needs to participate in the generation of knowledge and interact with other participants. This makes the researcher another source of information about the social act under consideration. Information is generated by the teachers and the researcher together. Research stops being an act on or about education, and a separate activity from other acts of education like teaching and learning. It becomes research in and for education.

An example of a research methodology associated with this perception of research is emancipatory action research (Carr & Kemmis, 1986, Grundy 1987). Grundy, (1987) describes action research as grounded in two essential principles; involvement and improvement. It has as its sites the arenas of human interaction and practice and these are investigated and improved. In the classroom context, the investigation and improvement are undertaken by teachers themselves. Improvement is not imposed but controlled by teachers involved in the situation under consideration. The improvement is both in terms of understanding and improved action and the two are inextricably linked.

Involvement of participants is based on democratic principles and happens in environments which encourage practitioners to assume ownership and control of the knowledge generated and to determine subsequent transformatory action. In cases where non-

practitioner assistance is required, it is the knowledge generated from within the action research group which is regarded as the authentic and legitimate basis for action. The emancipatory orientation requires that the non-practitioners become participants in the action rather than external observers. The research process is a cyclic interaction of stages of planning, evaluation and action. Issues are continuously reflected upon and action taken to bring about improvement. This approach is thus also committed to teacher development. Since it is the teachers themselves who ask research questions, who carry out investigations and who undertake appropriate transformatory action, the approach is potentially empowering and has the potential to enable teachers to become designers and directors of their own professional development.

Grundy (1987) warns however that not all modes of action research are emancipatory in nature. She elaborates how the technical and practical interests can also be served by employing action research as a methodology. She distinguishes the emancipatory mode from the technical and the practical as always characterised by a critical focus and a willingness to encompass the political context of action within the field of investigation. It is therefore intrinsically political and fully consistent with the ideas of improvement and involvement. The technical mode occurs in situations where action research is employed as a methodology which co-opts the participants in ways which may lead to superficial improvement without fundamental changes to the power relationships implicit in the social practice. In the practical mode, participants may not recognise that their meanings are distorted by hegemonies interested in maintaining the status quo (Grundy, 1987).

Although the three modes are informed by different knowledge constitutive interests, it is possible to find more than one of them in a research project, especially projects involving practitioners and non-practitioners working together. Grundy (1987) warns that, although a technical mode could develop into either a practical or emancipatory modes, these are not developmental stages. A shift from one mode to another requires transformation of the entire project, and not just its development.

2.3 Teacher-research, curriculum development and teacher development

In a critique of technicist approaches to curriculum development, Carr and Kemmis (1986) argue that because they are objectives-driven and product-oriented, they fail to develop the teacher as a professional. The overarching concern with achieving pre-specified objectives results in practices which concentrate on improving teaching as instruction without increment to the wisdom and the scholarship of the teacher. Such technicist views of educational change focus on bettering students without improving teachers' personal and professional quality. Such approaches make the task of curriculum design the preserve of academic designers and deprive teachers of opportunities to generate public knowledge about their work. It limits their participation in curriculum development to implementation and the use of curriculum ideas developed by others. One effect of the exclusion and neglect of teacher development is that the proposed changes may not be successfully implemented and are susceptible to teacher resistance. Teachers are the central people who operate at the site of envisaged changes, and if they are left out of decision-making processes, change becomes an obligation rather than a matter of interest and a worthwhile activity to the teacher.

Stenhouse (1975) challenges the positivist tradition of presenting curriculum as theoretical frameworks and points out that educational ideas expressed in books are not easily taken into possession by teachers. He argues on the other hand that, ideas expressed as proposals are exposed to testing by teachers and this establishes equality between those who propose educational ideas and those who evaluate them. Such equality enables teachers to identify with the material, to understand it and carry its activities out as their own. Such approaches to change, are more likely to meet teachers' approval and stand a better chance of success. As teachers have opportunities to interact with the proposed curriculum and scrutinise it, implementation is more likely to address specific and context relevant needs. This in turn makes change meaningful to the people for whom it is intended.

One alternative to the product-oriented approaches is a process model of curriculum development informed by practical interests (Grundy, 1987). Stenhouse (1975) describes it as "a strategy of curriculum design which attempts to arrive at a useful specification of curriculum and the educational process without starting by pre-specifying the anticipated outcomes of that process in the form of objectives" (Stenhouse, 1975:84).

A process approach to curriculum development attempts to define classroom processes in terms of what the teacher is to do and what the content is. Such a model centres around the process of learning, rather than around the product. A process-based curriculum pursues understanding rather than grades. Its greatest strength for teacher development is that it rests upon teacher judgement as well as the quality of the teacher. It is therefore committed to teacher development. "If teachers are to pursue understanding, develop and refine their criteria for judgement and their range in their subject, they must be able and they must have time and opportunity for professional development" (Stenhouse, 1975:96).

One of the major shortcomings of the process model is that, as the process is externally driven, it may serve interests other than those of teachers. If the research is carried out by another person then the teacher is still a recipient of ideas from other people. Theory about teaching and learning is still generated by other people. Elliot (1991) points out that theory which is generated by experts outside the school and outside the classroom is threatening to teachers.

> It is threatening because it is produced by a group of outsiders who claim to be experts at generating valid knowledge about educational practices...(the research techniques used by such experts) are symbolic of the power the researcher has to define valid knowledge...theory to teachers is simply the product of power exercised through the mastery of a specialised body of techniques...it negates their professional culture which defines teaching competence as a matter of intuitive craft knowledge, tacitly acquired through experience

(Elliot, 1991:45,46).

Elliot (1991) further points out that teachers' feelings of threat may be enhanced if the knowledge generated is expressed in the form of generalisations about teachers' practices. He argues that the implication of generalising the knowledge is that the individual practitioners' daily experiences are devalued and this reinforces the powerlessness of teachers to define what is to count as knowledge about their practice. Furthermore, expressing the knowledge as universal and applicable to all situations, implies that the experience of teachers operating in particular circumstances is not an adequate basis on which to generate professional knowledge (Elliot, 1991).

Stenhouse (1975) is also critical of the process model since it is still based on views that regard teachers as recipients of ideas from research conducted by other people. His position is that as curriculum research rests on the work of teachers, "it is not enough that teachers' work should be studied, they need to study it themselves" (p143). He therefore suggests a curriculum development model in which teachers carry out research into their work themselves. The point of difference between the process and research models is therefore that, while the process model advocates that teachers work must be studied, in the research model teachers are the researchers of classroom activities and the change agents who transform classroom activities.

Stenhouse's proposal is a major shift from traditional technicist views of research and of the role of teachers in research. A research approach can serve either practical or emancipatory interests. Even if teacher research does not challenge political issues in the broader society, the research can serve an emancipatory interest in the classroom and in the school. Political issues such as power relationships between teachers and students, and how they affect the freedom of each can be studied and transformed by both the teacher and the students.

A research approach places teachers at the centre of educational change where they play the role of change agents. They become researchers in their own classrooms, who design, evaluate and implement their own ideas. Teachers conduct research as they teach and teaching becomes a form of research marked by critical analysis and continuous reflection. The approach places the responsibility of educational change and the evaluation of such change in the hands of teachers. Stenhouse's (1975) proposal also challenges traditional power structures that deprive teachers of their autonomy and denies them opportunities to generate knowledge as they carry out their daily responsibilities and in their natural settings.

Another argument for a research approach to curriculum development is provided by Atkin (1992) who is of the opinion that much of the knowledge critical to worthy professional practice and to educational improvement is generated when teachers, in collaboration with other people, take action to meet their professional obligations. Atkin (1992), further indicates that an approach that encompasses the notion of teaching as research is emancipatory. It is an important approach in that the research process does not only result in the production of meaningful knowledge, which is relevant to teachers' specific contexts, but that it is also a professional development exercise because the "researcher-teacher becomes a different professional as the research process unfolds and as a result of it" (Atkin, 1992:386).

Nixon (1981), also puts forward several arguments for teachers to become researchers in their own classrooms. Firstly, he believes that by investigating and reflecting upon their practice teachers may increase their understanding of the classroom. For example they may understand better why children behave in certain ways and why they interact with subject matter in certain patterns. This understanding informs the teachers' judgement about such things as how children learn, what the critical moments in this learning process are and how and when the teacher should intervene so as to facilitate the learning process. Furthermore, such inquiries may increase the knowledge and understanding of teachers in such a way that they are able to respond more sensitively to the needs of their pupils, in

terms of both face-to-face classroom interactions and more formal aspects of curriculum planning and school organisation.

Secondly, Nixon (1981) believes that teacher-research, has the potential to develop the teacher professionally as it sharpens perceptions, stimulates discussion and encourages questioning. These processes involve teachers in assessing themselves, as well as their pupils. It enables teachers to discover more about themselves and how their personal views and beliefs shape their practice. The approach brings with it a boost to personal confidence and a shift in self-image, which in turn lead to a sense of power and positive self-esteem. This results from being able to grow professionally through one's own efforts rather than relying on others to provide direction.

Hopkins (1993), calls this an emancipatory potential of teacher research where emancipation refers to, "the process involved in liberating teachers from a system that denies individual dignity by returning to them some degree of self-worth through the exercise of professional judgement" (Hopkins, 1993:35).

Edge and Richards (1993) provide further motivation for teacher-research by highlighting the potential of the approach for both curriculum development and teachers' personal and professional development. Firstly, they argue that teachers are best placed for classroom research and classroom change as they are familiar with the complex circumstances involved in the teaching and learning processes. What learners experience in the classroom is the direct source of information about the learning of any subject. Teachers are uniquely situated to observe learners over long periods of time and in a variety of academic and social situations. This enables them to analyse events armed with inside knowledge about the culture of the community, the school, the classroom and to connect the events of classroom life to the roles and responsibilities of teachers. These conditions make it possible for their findings to be both more general than those that concentrate on the effectiveness of specific techniques, and more specific than those that explore the meanings of customary schools and classroom events (Lytle and Cochrane-Smith, 1994).

The second point made by Edge and Richards (1993) is that, teachers assuming the role of classroom researcher are interested in their students learning and in the effects of their teaching on learning. They are therefore interested in how their interactions with their pupils affect learning and how the classroom environment impacts on learning. As the teacher-learner interactions and the environment can be controlled by the teacher, by studying them and changing them, classroom change is more likely to be successful and to address the real and important needs for the particular teacher and the particular learners.

In addition, Lytle and Cochrane-Smith (1994) argue that the relationship between the teacher-researcher and students enables a situation where teachers work with students to re-negotiate the meaning of student ability, construct new routes to textual understanding and alter views about knowers and knowing in schools and classrooms. This approach diminishes distinctions between researcher and researched, by making the agenda for class public and by involving students in on-going analysis of data. In this way, teachers both research their own teaching and teach as a way of research. This is a dialectic and potentially emancipatory process.

The third point made by Edge and Richards (1993) is that classroom research relates directly to teachers' interests and concerns as the teachers can determine research areas pertinent to their life. Teacher research may therefore address issues relating to teachers' perceptions of educational research as irrelevant and of limited use to their work. It may also solve issues of ownership of research activities and thus reduce resistance to innovations. The processes of research equips them with knowledge and skills for on-going renewal of their teaching practices. The process of research is, thus, also a process of personal growth and a form of self-directed professional development. It makes professional development personal and meaningful. Because research gives them skills for on-going renewal, their training becomes continuous, on-going, self-directed and can adapt to social and political conditions at different stages of a teachers' professional life.

Lytle and Cochrane-Smith (1994) further argue that the different theory of knowledge upon which teacher research is premised, and to which it contributes, fundamentally redefines the notion of knowledge for teaching. It alters the locus of the knowledge base and re-aligns the practitioner's stance in relation to knowledge generalisation in the field. These authors believe that legitimating the knowledge that comes from practitioners' research on their own practice is a critical dimension of change in both school and university cultures. "In challenging the university's hegemony in the generation of expert knowledge for the field, teacher research also challenges dominant views of staff development and pre-service training as transmission and implementation of knowledge from outside to inside schools" (Lytle & Cochrane-Smith, 1994:36).

Teacher research also has several implications for teacher education. When teaching is treated as an inquiry process, teachers then stand in a different relationship to their own knowledge, to their students as knowers and to knowledge generation in the field. Teachers cease to be experts in pre-defined knowledge, and they cease to be transmitters of knowledge to passive recipients. Knowledge also becomes a product of social processes in the classroom. This re-definition of the relationship between teachers and their knowledge leads to a situation where teachers reconstruct their classrooms and begin to offer different invitations to their students to learn and to know. Furthermore, when teachers research their own practices, they also provide opportunities for their students to become similarly engaged in research.

> Researching teachers create classroom environments in which there are researching students, students ask, not just answer questions, pose, not just solve problems and help to construct curriculum out of their own linguistic and cultural resources rather than just receive pre-selected and pre-digested information
>
> (Lytle and Cochrane-Smith, 1994:37).

Another implication of a research approach to teaching and to the professional development of teachers is that the notion of learning from teaching should be made the primary task of teacher training. Learning from teaching means that,

> inquiry ought to be regarded as an integral part of the activity of teaching and a critical basis for decisions about practice...and that classrooms and schools ought to be treated as research sites and sources of knowledge, which are most effectively accessed when teachers collaboratively interrogate and enrich their theories of practice
>
> (Lytle & Cochrane-Smith, 1994:38).

Ebbutt and James (1981) describe their experience as teacher-researchers and highlight a number of issues from this experience. Firstly, they point out that extrinsic motivation is very important to get teachers involved in and sustain research activities. Their own experience was that without their prior experience with research and their involvement in other structures that provided either support or external motivation, research was too demanding. They found that the motivation to begin and sustain teacher research depends significantly on contacts with other people engaged in the same kind of activities, whether these people assume a role of "expert supervisor, sponsor, consultant, collaborator or critical friend" (p82).

Secondly, they found that teachers who attempt to do research on their own are likely to encounter a number of difficulties. Their experience was that even if research is confined to the teacher's own classroom, it may sometimes be interpreted as threatening to colleagues. For example, in a situation where the teacher-researcher openly involves students in the evaluation of lessons and the evaluation of the teachers' practice in particular, her colleagues may interpret this as undermining her own professional status, as well as their status. Looking at one's own practice openly could be interpreted as publicly confessing one's shortcomings. It could be perceived by others as lowering one's image as well as the image of the profession as a whole. In some cases, students of the teacher-researcher, who are encouraged to provide feedback about the teachers' lessons, may

carry this attitude over to other classes, where those teachers are unprepared for such an attitude and such a response.

In addition Elliot (1991) points out that due to its self-reflective nature, teacher research may lead to dilemmas arising from a clash of professional values between those which underpin the traditional craft culture and those which underpin an emergent culture of reflective practice. He emphasises that this clash occurs much more within individuals than between individuals. Elliot (1991) also shows that although the process of sharing data promotes reflective conversation and is at the heart of any transformation of the professional culture, it carries the risk of bringing latent conflicts and tensions out to the open. When problematic areas of practice are exposed, some practitioners may become vulnerable to people who point fingers at them. His experience is that teacher-researchers find sharing data with peers from other schools more conducive to reflective conversation than sharing it with their colleagues. In the former context, there are fewer latent conflicts and tensions to be exposed. He further notes that the teacher-researchers may find themselves in a dilemma about risking such exposure even when they feel confident in their ability to handle the conflict and tension.

A further problem for teacher research is time. Elliot (1991) found that one of the constantly cited problems for teacher research is time. The problem emerges from the fact that research and traditional teaching duties are treated as separate and competing. The problem of time tends to be viewed as a teaching versus research dilemma which gets resolved in favour of teaching. Elliot (1991) notes that, first and foremost, teachers see themselves as classroom teachers and their first loyalty is either to their pupils or their subjects. Teachers are also reluctant to put their experiences down in writing. The difficulty arises from their assumption that their case studies have little of interest to report. "This reluctance, paradoxically coincides with a strong desire for professional acknowledgement from within and beyond the institutions of their role as reflective practitioners" (Elliot, 1991:65). In addition, they also assume that qualitative studies are

low in generalizability as generalizability depends on the extent to which data can be statistically aggregated (Elliot, 1991).

The issues raised above, relating to the potential and limitations of teachers' involvement in research as researchers are derived from international experiences. The contexts from which the issues emerge are significantly different from the context of the study reported here. The next section discusses the past and present ideologies which have impacted on educational practices in South Africa, especially on curriculum development and teacher development.

2.4 The South African context

Education plays a major role in the social and political structures and practices of all societies. It is a highly political aspect of the South African society. At different historical points in South Africa, dominant values, beliefs and assumptions have influenced the view of education and its purpose in the country. This has led to different national policies on education and on the professional activities of the teaching community. In a description of ideologies that have played a significant role in issues involving schooling in South Africa Ashley (1989) identifies three types, namely, Christian-Nationalist, Liberal and Liberation-Socialist ideologies. He links the ideologies with different sectors of the society, namely, the Afrikaner nationalists, the white liberals and the former liberation movements, respectively.

The Christian Nationalist views of the Afrikaners gave rise to Christian Nationalist Education (CNE), an approach to education that dominated the apartheid era. This view of education has two characteristic features, firstly that education is based on the Christian Gospel as interpreted by Afrikaners, and secondly that mankind is divided into nations and education should reflect these national differences (Ashley, 1989). CNE is a product of the view that God is the ultimate authority and that his word, or that of his representatives, is the 'truth' and can neither be challenged nor critiqued. This 'truth' is universal and applies

to all situations. Interpretation of the truth can only be done by those qualified for that purpose, and everyone else is expected to abide by these interpretations.

The Christian Nationalist view of childhood portrays a child as deficient and an irresponsible human being who needs to be guided by adults towards adulthood. Adulthood is regarded as the stage in life where humans have acquired wisdom, are responsible and have the authority to lead others to the right way of life (Ashley, 1989). CNE therefore views the responsibility of teachers as moulding children towards adulthood, which is pre-defined and modelled on the norms and traditions of the nation to which the child belongs. CNE gives teachers powers to channel children into desired directions of development. The teachers are regarded as authorities who derive their authority from having successfully traversed the journey to adulthood. So communities entrust their children to teachers and trust them to instil moral values, spiritual values and respect for the traditions and norms of their respective nations. The teachers are in return obliged to be exemplary in their adherence and conformity to established norms. They are not expected to challenge authority.

Within the CNE tradition, Curriculum development processes were highly centralised and bureaucratic, occurred outside the public domain and were largely non-participative (NEPI, 1992). Syllabuses were developed by subject committees and the syllabus documents were prescriptive and detailed, thus inhibiting teacher initiative in the classroom. Although decentralisation allowed for some local differences and innovation, such initiatives tended to be limited in scope (NEPI, 1992). Teachers worked in authoritarian and bureaucratic environments which largely excluded them from curriculum decision-making. They were largely receivers and not creators of the curriculum. Their working conditions, especially in African schools, created an environment where classroom activities were teacher-centred and generally showed strict adherence to prescribed syllabuses, as well as heavy reliance on textbooks and other forms of received knowledge (NEPI, 1992). This created fertile environments for transmission of factual information and rote learning tendencies.

Teacher training in Afrikaner and most African institutions, was predominantly based on Fundamental Pedagogics (Macleod, 1995). This is an approach informed by a perception of education as the process of accompanying children to adulthood. An implicit assumption in this is that children are the only ones who learn, and that interaction between teachers and children comprises a one-way flow of information. Advocates of Fundamental Pedagogics regard theories about knowledge and about learning as universal, and value-free. Another underlying belief of Fundamental Pedagogics is that people can put aside their personal interpretations, beliefs, prejudices and opinions and prevent these from interfering with the process of teaching. This approach to teacher training thus prepared teachers to become experts who transmit knowledge to students. It prepared teachers who needed to be in charge and who valued the exercise of authority over students. In a review of past teacher training practice, NEPI (1992) reported that the scientific and objective theories of Fundamental Pedagogics prevent teachers from developing an understanding of the relationship between education and the context in which knowledge and understanding are created and shared. Thus Fundamental Pedagogics neutralises and de-politicises education and does not equip students to critically analyse its claims about education (NEPI, 1992).

The teachers who were trained during the CNE era were therefore exposed to theories informed by positivist thinking and promoting technicist practices. They were not prepared to be reflective and critical practitioners. They were not exposed to curriculum processes that place teachers at the centre of educational change as well as processes that encourage teachers to become active knowledge producers and change agents.

Several people and institutions who rejected CNE and its views on education came up with alternative theories of education and advocated changes in the role that teachers play in curriculum development. One such ideology in which alternative approaches are embedded is liberalism. Ashley (1989) describes it as an ideology associated mainly with the liberal English speaking institutions and some sectors of the broader liberation

community. He describes it as a view premised on liberal ideals that advocate individual autonomy and call for the creation of environments that allow individuals to flourish.

Liberal teacher education exposed teachers to theories of education that attempted to humanise education (Macleod, 1995). The liberal theories focus on the development of the individual rather than conformity to universal laws and expectations. An example of a liberal approach to teaching and learning is the child-centred approach to teaching. A key feature of this approach is that teaching should start from the point of view of the child. Learning environments should be created which enable the child to be actively involved in constructing his/her own knowledge, drawing on his own experiences and conceptions, and interacting with others to challenge, clarify and reconstruct these conceptions. The liberal teacher therefore becomes a facilitator and his/her teaching is aimed at stimulating the child to learn. Ashley (1989) notes that liberal ideas and practices have not had a major impact in the South African education system, except perhaps in the independent schools.

Although the idea of child-centred teaching and learning processes is an improvement over the technicist view espoused by the CNE, Macleod (1995) points out that it is still a controlling mechanism, which employs covert instead of overt regulatory mechanisms. For instance, by defining the nature of the child, certain behaviours are produced and regulated. "In assuming that the child will develop naturally given the correct environment, the child becomes an object of the pedagogical and scientific gaze and is monitored to establish whether the correct mental and emotional strategies are unfolding" (Macleod, 1995:69).

Another criticism is that by working towards individual autonomy, without taking into consideration societal constraints, the liberal views assume equality of opportunity and equality of access to conducive learning environments that may be unrealistic.

A third alternative ideology discussed by Ashley (1989) is Liberation-Socialism. The theory of education that has been associated with this ideology is critical pedagogy,

popularly advocated in the principles of People's Education for People's Power (Ashley, 1989). People's Education emerged in a context of generalised challenge to apartheid structures and draws largely on the ideas of Paulo Freire. In South Africa, Freire's ideas were important to the oppressed majority as they were challenging a system that had a discriminatory view of humans, promoted and justified inequalities between universities and schools, between bureaucrats and practitioners, between adults and children and between teachers and learners.

The present government is constituted mainly of people from the liberation movement and people who advocated People's Education. It is a government elected to transform the South African society and to get rid of injustices and disempowering practices inherited from the past. Redress for previously underprivileged sectors of the society is also an important principle. These ideals notwithstanding, Deacon and Parker (1996) point out that because the exchange of political power was negotiated rather than acquired through a revolution, the theories that influence the present direction of educational policy and practices will be informed by three discourses, namely, the traditional, the vanguard and the critical, in a contradictory amalgamation. These authors define the traditional discourse as a combination of the Nationalist and the liberal ideologies. They associate the vanguard and critical discourse with the former liberation movements. They note that one of the problems emerging from this conglomeration of views which differ in some very fundamental ways, is that it fails to address serious inequalities and carries forward some of the shortcomings of past systems. Deacon and Parker (1996) argue that for instance,

> the currently hegemonic policy consensus in education which conceives of itself as transcending the division of the past and emphasises the practical process of reconstruction and development, conceals the persistence of inequalities and its own continuity with previous discursive formulations
>
> (Deacon & Parker, 1996: 164).

One such persistence of inequalities is in the role of teachers and learners in determining what constitutes meaningful learning. A centralised system almost inevitably implies hierarchies and power inequalities in the education system.

The present political dispensation does, however, provide more opportunities for teachers' involvement in curriculum development and innovation. Participation of stakeholders is encouraged at many levels. Policy for curriculum development, although mainly the responsibility of national structures, has created potential for increased teacher participation. Adaptations of curriculum frameworks and additions to the core curricula are permissible and regarded as important aspects of curriculum development. With regard to teacher education, professional growth and the self-confidence borne of such growth are regarded as key elements of teacher development (Department of National Education: White Paper on Education and Training, 1995). The recommendations of the Committee on Teacher Education Policy (COTEP, 1995) indicate a shift from past practice which prepared teachers for technicist roles, to an emphasis on the teacher as a critical professional who can exercise professional judgement in the classroom.

The COTEP recommendations for pre-service training of teachers indicate a desire to promote self-critical and self-reflective tendencies in teachers and to produce teachers who can take part in curriculum development. For instance the aims for teacher education include that teachers should develop,

> the ability to be self-reflective and aware of one's own learning strategies, thinking processes and teaching styles, and to be able to articulate them to assist students in their learning...the ability to reflect critically on their own practice...the ability to reflect critically on education in society, being autonomous, flexible, creative and responsible agents of change
>
> (COTEP, 1995:9,10).

The extent to which these ideals for teacher education will impact on the quality of teaching and learning in South Africa is yet to be seen. However, the explicit aims of

promoting critical reflection provides opportunities for teacher educators and teachers to explore approaches that promote such skills. These approaches include teacher research, action research and, in general, a research approach to curriculum development and teacher development.

A literature search for existing examples of teacher research and action research by teachers, revealed that such activities are not abundant. For instance, Levy (1993), surveyed seventy projects to determine work being done with problems facing science education. She consulted a wide range of organisations, namely, non-governmental organisations, schools, universities, technikons, colleges of education, INSET centres, education departments, private sector projects and teacher associations. She reported from that study that over half of the programmes surveyed were of a remedial nature, and were heavily content-driven, paying much less attention to context-related aspects, child or leaner-centred approaches, cognitive skills and conceptual understanding. There were few projects which focused on teacher development based on principles of empowerment, and learning as socially constructed. She reported that the concept of teachers as action researchers and curriculum developers was being developed by only a handful of the projects in the country. In a more recent teacher education audit, Potterton, (1996) found that NGO INSET intervention is mainly concentrated in the areas of teaching methods and subject content, with 85 % of the INSET activities focusing on these areas. So the concept of teacher as researcher may be largely unexplored in South Africa.

The literature search also showed that where teacher research and action research happened, this tended to be in academic settings, where the research is done as part of an academic course, and the teachers' motivation for the research, is partly a desire to pass. The research efforts are also not initiated by teachers in school settings, as part of their daily duties. The origins of such research actions not withstanding, the studies provide useful information about the potential of such approaches to curriculum development, to classroom change, and to the professional development of the teachers involved. They

also provide insights about some of the issues that emerge in situations where teachers are researchers, rather than subjects of research.

An example of action research incorporated into an academic course is provided by Adler (1993). She describes an action research project undertaken by a Bachelor of Education (BEd) student as a response to her encouragement that students should undertake action research in their classrooms. Her motivation for encouraging students to do action research projects arose from two reasons. Firstly, the BEd course was predominantly theoretical and the ideas and ways of looking at education had little impact on the teachers practices. Action research on the other hand had the potential to ground theory in practice. Secondly, she felt that practising teachers in South Africa tend to perceive themselves as users and not producers of knowledge. Therefore action research could offer possibilities for shifting this perception.

Her student, whom she calls John, engaged in an action research project focusing on his own teaching of word problems in mathematics. The results of the project indicate that John gained tremendous insight into his practice. For instance he came to see how his practices were such that he dominated classroom interaction and that his teaching was exclusive, concentrating on very few students, mostly male. Without some systematic method of observing his teaching processes he would still be unaware of how he talks in class and to whom. Eight months after completing the course John was still excited about action research and was trying to get his colleagues into it. On reflection, he showed that the research experience had made him utilise all opportunities in his classroom to reflect on himself. He has learned to examine the assumptions he makes about learning situations which in turn influence his classroom practice.

Adler (1993) reflecting on John's work, feels that one of the important issues that emerge from university-based teacher research for teachers and teacher educators relates to how the symbiotic relationship between teacher as theory-maker and teacher as developer of practice can be sustained outside the supporting structure of a university degree. She

further points out that the more serious challenge lies in dealing with issues like gender bias which have deeply rooted social foundations and which a teacher may not wish to confront. The demand on action research, for the teacher is that it should enable him to act, reflect and deal creatively with these issues.

At the University of Durban Westville (UDW), Naidoo et al, (1993) reported one attempt to develop alternative approaches to Fundamental Pedagogics. They developed a science teacher education programme designed to encourage and support reflective and collaborative practices during the students' university-based activities and during teaching practice. The authors reported several issues and findings that emerged during this process. They found that the students were very dependent on other peoples' ideas and did not have a high regard for their own ideas. One of the first challenges for the teacher educators was therefore to find ways in which the students could be encouraged to value their own thoughts, their own ideas and their own experiences. They needed to do this in order to use their latent knowledge and past experiences as part of reflective exercises. Another challenge was to find ways in which students could be encouraged to link their learning at the university with teaching, so that their learning could influence their teaching practice. These processes required skills that teachers did not posses and this in turn made the exercise a very difficult challenge for the teachers.

Naidoo et al (1993), also found that during the programme, students needed to develop reflective and collaborative tendencies and attitudes, and this was difficult. From discussions with students, it emerged that neither school nor university had encouraged a culture of collaboration but rather one of competition and individualism. As indicated earlier in this chapter, collaboration enhances teacher research and helps to establish supportive environments. Sustainable research and reflective practices require collaboration as the teachers need to share their ideas with others and engage in debate with them. The lack of collaborative skills could therefore become a major setback to teacher research once the teachers leave the university and become full-time teachers.

The students engaged in action research activities during their teaching practice. On later reflection of the experience, they reported that the opportunity to reflect on past actions enabled them to contest and challenge their perspectives of teaching and their roles as future teachers. Furthermore, their comments suggested that they will cope with a changing education system much more easily, because the reflective experience will force them to continue engaging with their new actions. Naidoo et al (1993) indicate that their experience showed that the conditions required for students' developing reflective skills and employing action research in teaching were, the establishment of a climate of openness; the recognition of the need to negotiate the meaning of experiences; and for student teachers to make meaning for themselves.

In another study at UDW, Goolam (1997) undertook an evaluation of the impact of action research on teaching practice. This research followed the introduction of action research as a framework for teaching practice in the Faculty of Education. Goolam's study was intended to test the assumption that action research enhances the quality of practice teaching. The evaluation used both student teachers and resident teachers as sources of information. The student teachers provided information on the merits and demerits of action research. The resident teachers verified that action research did transpire. Both groups of teachers made suggestions and recommendations about the type of changes necessary with regard to action research and teaching practice. Table 2 provides a summary of the merits and demerits of action research reported from Goolam's study.

Table 2: The merits and demerits of action research: (After Goolam, 1997)

MERITS	DEMERITS
It enhances the level of preparedness of student teachers to engage in teaching.	It was too time-consuming and lessons could not be completed in time because of extensive preparation.
It elevated the enthusiasm and confidence of student teachers.	It was too demanding on student teachers because recording the process of action research was a tedious process and students were sometimes too occupied with their research and as a result compromising their teaching responsibilities.
It enabled familiarisation with the context prior to the commencement of teaching.	It resulted in a wastage of resources because paper was at a premium in school and demands of generating materials exarcebated the problem.
It enforced continuous analysis and critical reflection on practice teaching.	It sometimes resulted in lesson plans that were too advanced for pupils.
It improved the quality of the content and teaching methodology.	It created unnecessary tensions, caused either by resident teachers being uncomfortable with sharing their practices with student teachers or by there being a conflict of interest amongst student teachers.
It helped to unleash a creative spirit in teaching.	It made pupils uncomfortable with the prospect of being guinea-pigs in research.
It fostered openness to criticism.	It was assumed that resident teachers were aware of the nature of action research.
It facilitated collaboration amongst student teaches and with resident teachers.	
It refined communication skills because of interactive nature.	
It generated a special relationship between teachers and pupils because of the concern to improve practice.	
It dissolved a blaming syndrome and replaced it with positive attitudes to improve practice.	

Recommendations made by the teachers for change included that the teachers, both student teachers and resident teachers, need education and guidance on the processes of action research. They pointed out that it is necessary to recognise the resource requirements for the process. The teachers also recommended that care must be taken in the choice of schools to ensure that the vision of the school is compatible with action research. On the whole, Goolam (1997) found that the advantages of the use of action research outweigh the disadvantages. It can be made to flourish if it is evaluated and the findings taken into account in the subsequent organisation and running of action research activities.

A more radical and socio-politically oriented discussion of action research is provided by Walker (1990). She explores the potential of action research in a context of educational, and political transformation from an oppressive apartheid era to a more democratic dispensation. In this context she highlights the need to distinguish between change as reform and change as a more radical and progressive transformation. Her interest in action research arises from a perception of it as an appropriate strategy whereby teachers might improve their work. It also arises from the potential of action research to inform crucial questions about, "transformatory curriculum practice in People's Education while also contributing to the professional growth of teachers trained under apartheid education" (Walker, 1990:57).

Walker (1990) argues that for teacher-activists, action research offers the possibility of sustained and reflective classroom inquiry in the interest of developing a critical pedagogy for a future South Africa. While acknowledging that the ultimate transformation of education may be a result of political action, she argues that the intervention of critical and committed teachers in the educational process is "arguably fundamental to transforming schooling and developing strategies of pedagogical intervention" (Walker, 1990:60). Furthermore, she argues that in a context where 93% of teachers are under-qualified and where most lack models of effective practice, the importance of reflection on action and its empowering potential should not be underestimated.

Through action research, teacher activists can challenge hierarchies and power structures that disempower them. Walker (1990) points out that the experiential learning inherent in action research is a direct antitheses of imposed knowledge and hierarchical relationships at all levels of the education system. As the teachers schooled and trained in apartheid education are not well equipped to facilitate creative, critical and dynamic learning, action research might be one way in which they penetrate their classroom action and develop professionally in the interest of emancipatory classroom action (Walker, 1990).

The arguments posed by Walker (1990) were made prior to the 1994 elections that saw a new government elected into power, and with that government a different set of ideas, assumptions and expectations of what the nature of the South African society should be. For instance, as shown by documents of the new government, (COTEP, 1995 and the White Paper on Education and Training, 1995), their ideals for the education system and their belief systems differ from those of the Christian-Nationalist approaches of the past. However, the struggle for emancipatory education might just be starting, and perhaps those interested in transforming education might be facing different and more difficult challenges. In the past, there was a struggle for the entire social and political system, including education and there was generally a clear idea of what is wanted and some ideas of what the future should be like. In a context where the political structures have now been democratically elected and have popular support, the need for genuine transformation of education and the power structures inherent in it might be veiled by an apparent democracy. This may further be aggravated by expectation that the political leadership will deliver a system that gives teachers autonomy and emancipation. Thus, a research approach to education and the creation of a teacher-research culture may be needed now more than ever before.

A literature search for examples of teacher research/action research in other developing contexts led to little success and provided limited information. One example found, which relates directly to action research, was that of project in Lesotho, reported by Stuart (1991). She describes a number of examples of ways in which the teachers felt that the

action research exercise had been meaningful to them. The team of teachers developed their ability to break out of a situation where they felt stuck or confused and were able to re-frame their classroom problems so as to make them more amenable to action. All members of the team extended their repertoires in several ways through discussions and reflections where they shared ideas and by being stimulated to try out new approaches. The teachers carried out a number of experiments-in-action and received enhanced feedback through the use of various forms of data collection. They identified and elaborated aspects of their value systems, reflected on these and clarified what they understood as good practice. They began to develop new concepts and to build theory grounded on their own findings. The findings and the teachers' interpretations of the findings were shared, critiqued, refined and made available to the local professional community.

Stuart (1991:149) notes that, although, by their own confession, the teachers had not developed into fully fledged researchers,

> the action research project had helped (them) to be more aware of what was going on in their classrooms, more able to analyse what they were doing and to change their actions appropriately. There was some evidence that this did not end with the project; they had developed the capacity for self-sustaining professional growth, and the results were encouraging others to follow the same path.

It is worth noting that the project described by Stuart (1991) was small scale and that the ministry of education was not really involved in it, although they were aware of it. The lack of involvement from higher structures in the education system is one potential problem for teacher research. Many African countries have highly centralised curriculum development practices done through curriculum development centres. Teacher involvement in these processes is minimal (Yoloye, 1986). The teachers are often only implementors of syllabuses developed by others who are mostly not located within the school or the classroom. The indifference of the ministry of education alluded to by Stuart

(1991) to the efforts of promoting reflective thinking and teacher research means that it is very difficult to create support systems in the school which will help sustain such efforts.

Another innovative project in Africa that is based on principles of participation, collaboration, critical reflection and improvement is the Zanzibar Science Camp Project (Lange, 1990). This project is a model of how students, teachers, other educational practitioners and administrators can come together to bring about change that is meaningful to all engaged in the process of transformation. It provides examples of practitioners engaged in on-going systematic inquiry and transformatory action. In this project, roles of participants are not fixed, they all learn from each other and through their interaction also teach each other.

In a description of the project Lange (1990) indicates that participants are gaining understanding on, not only what is required for a better science education, but also how institutions and agencies consisting of people who want something better can learn to re-organise themselves to bring it about.

> Ultimately, people will have to form organisations which have built into them the possibility of being in a permanent state of change and growth...we must build dynamic systems of people who experience problems as possibilities and challenges and see progress in change. Relationships must be built so that everyone can contribute and share in the pleasure of that contribution
>
> (Lange, 1990: 1).

The Zanzibar camp project is an example of an inquiry approach to curriculum development in which practitioners are not subjects of research but collaborate with other people to generate knowledge about teaching and learning and about environments that are conducive for effective learning. Its inquiry approach engaged teachers in processes where they could monitor and direct their own professional development. The camp also provided opportunities for both teachers and children to engage in inquiry. Ideas that shaped the camp were frequently scrutinised, refined, modified. New ideas emerging from

the camp experiences were acted upon and their outcomes subjected to the same cycle of scrutiny and reflection. The camp is also an example of how an inquiry approach to curriculum development can lead to collaboration of people derived from different levels of the education system. It is a model of how curriculum development processes can genuinely be democratic and how power structures in the generation of knowledge can be dissolved.

It is from this Zanzibar Science Camp Project that the IPEB science camp, described in detail in chapter three, drew ideas. The IPEB Science camp was also facilitated by one of the main facilitators of the Zanzibar project, Lange. The IPEB project however was not a replica of its Zanzibar counterpart. It had to take into account the nature of the South African context and was initiated with slightly different goals. One objective was to explore the concept of teacher research by teachers involved in the project. The aim was to identify factors that enable teacher research as well as those that are constraints. This information would provide insights about the conditions and support mechanisms necessary to encourage, facilitate and support teacher-researchers and teacher research as an approach to curriculum development.

From the international and South African examples of teacher research and action research, it seems possible that action research or teacher research could provide solutions to some educational problems in this country. It is important that efforts be made to determine the extent to which it can provide solutions for South African educational problems. It is also important to determine its implications for teachers and for the schools in which it is adopted as an approach to educational change. Some questions that need to be considered with respect to teacher research include questions relating to the support structures necessary to sustain it. Also in countries where action research and teacher research have been tried out, why is it still only some groups of teachers, why isn't every teacher a teacher-researcher? These are some of the issues that policy-makers, teacher educators and teachers themselves have to grapple with in dealing with the role of teachers in curriculum development in this country and other developing contexts.

The interest of this study was in research that is intended to enable teachers to move away from positivist modes of thought and from assuming technicist roles in research and in teaching. Focus was on activities that challenge teachers to become reflective and critical practitioners, who are concerned with the quality of teaching and learning situations rather than increasing their efficiency in attaining pre-determined goals, and producing pre-determined outcomes. Teacher-based research is discussed in this report as both teacher research and action research. The terms are used interchangeably, although some differentiation, such as that made by Hopkins (1993) are noted.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 BACKGROUND TO THE STUDY

This study was done as part of an initiative undertaken by The Institute for Partnerships between Education and Business (IPEB), to investigate issues around action research and teacher research and the role of these approaches in educational change. IPEB is an organisation that has as its major objective, the development and promotion of partnerships between the business and educational sectors. One of the IPEB aims is to focus on initiatives that develop appropriate curricula, with an emphasis on science, technology, society, environment, life skills, the world of work and economic empowerment (Raubenheimer, 1996). The project in which this study was undertaken, is one such initiative.

The project, referred to as the Eskom Electricity and Energy Project (EEEP) was financially backed by ESKOM and the scientific activities in the project were organised around the scientific theme of Energy and Electricity. As indicated in chapter two, the project was based in part on the Zanzibar Science Camp Project facilitated by Lange in Tanzania. In reports and other presentations of the project, Lange (1990, 1996) highlights a number of lessons from the Zanzibar Science Camp Project which may be of relevance to South Africa and other developing contexts. For example, the Zanzibar experience showed that educators can learn from working with children in 'rule-free' environments such as camps. "Rule-free environments are those in which the anxieties of holding to rules and reaching externally defined objectives can be legitimately relieved. (They are situations where) arguments urging people to let go and try some new things can be won" (Lange, 1996:2).

The Zanzibar project also showed that participants in such environments could gain improved understandings about what is required for institutions and agencies consisting of people who want change, to re-organise themselves to bring about the change.

Furthermore, the Zanzibar experience demonstrated that alternative approaches to curriculum development which involve the participation of all stakeholders, including learners, could result in meaningful learning for all. Learners, teachers, inspectors and other departmental officials could genuinely construct the curriculum together and establish alternatives to traditional top-down approaches. Such initiatives result in increased awareness of pedagogical issues, an awareness which is not arrived at through coercion but is a result of heightened self-reflection and critical analysis of practitioners' actions and the situations in which the actions take place.

Raubenheimer (1995) notes several features of the Zanzibar project which are described by Lange (1990) as important for its success. These included the fact that children and their learning were a central issue in the camp. Educators were interested in learning something about the ways in which children learn and interact with adults in settings outside the formal schooling system. Another key characteristic was that the participants in the camp represented the entire education system and so the camp was a micro-system resembling the entire Zanzibar education system. The curriculum constructed in the camp therefore had influences and perspectives from the different levels of the system. There was no need afterwards for products to be handed down to others for implementation. All the stakeholders in the system interacted as equals and each trained themselves in the role they were to play at the camp and afterwards.

The IPEB initiative was to build on some of these characteristics and lessons from Zanzibar. It was important, however, that the IPEB project be tailored to suit specific needs and issues for South Africa. To this end, change agents at various levels in the education system were identified to become part of the EEEP. This was also to enable the

project to be broadly representative of a range of stakeholders, including teachers, in-service educators, departmental officials and business personnel (Raubenheimer, 1996).

There were three main areas of interest for the IPEB project, namely, issues in curriculum innovation and change, child-centred approaches to teaching and learning and the development of more relevant materials (Raubenheimer, 1996). The specific research relating to curriculum development and teachers as change agents was to focus on:

- examining constraints and barriers to change in particular settings,
- considering ways to overcome these,
- evaluating the structures that are necessary to support change,
- developing alternative approaches (e.g. themes, work related examples),
- implementing examples of a more relevant curriculum and reflecting on the way teachers and children respond to these new ideas and approaches,
- documenting stories about change and the ways in which people have been involved in becoming more reflective and critical agents of change.

To meet these goals, change agents, including teachers were to be involved in generating ideas, activities, materials and trying these out in their contexts. This was to be done through processes of action research. This ideal for action research changed with time and with a realisation that most participants did not posses skills to engage with research at that level.

The team was assembled mainly by the IPEB co-ordinator, and was made up of teachers that she knew through her previous work as an INSET provider and also through the help of contacts she had with INSET organisations. Some of the teachers who came for the first two meetings, then identified and invited others to join the team. The number of participants started off at twenty but subsequently declined for a number of reasons, some of which are discussed later.

The research project was designed as a collaborative effort between all participants in the team. From the onset, everyone had a choice to either take part or withdraw, if they did not feel the research was important or meaningful to them. Attempts were made for everyone to try to identify intrinsic factors that motivated them to become a part of the research project. Discussions were also held, which were aimed at providing opportunities for individual participants to identify ways in which the project as a whole, and research in particular, could be meaningful to them. The interest in studying teachers' attempts to do research was also made explicit from the start. Some teachers later explained that it was the frankness about the research and what it hoped to achieve that made them decide to continue their participation in the project.

Many of the teachers were excited with the prospect of being researchers, and most decided to take part with the knowledge that somebody would be observing them. Those teachers who initially felt that the research made them objects of a study appreciated the fact that unlike prior experiences which they had with researchers, this time they would be active participants in the research, and the opinions and perceptions of the researcher would be subjected to reflection and discussion just like theirs, and that the outcomes of the research would not necessarily be used to dictate to them how to do their job. They appreciated the fact that through engaging in research activities, they would learn how to make their own decisions about what works and what does not work for their classrooms. They could even make decisions about the relevance or irrelevance of my research to them. Therefore, all those who continued felt they had a reason to be part of the project.

Another factor that increased co-operation and commitment was the fact that attempts were made to collectively shape the project, including discussion on how participation of teachers in the research could be formally recognised, for instance, through acknowledgement in documents written about the research. The group also discussed ways in which the teachers' efforts in the research could be publicised and promoted, for example through presentations in conferences. The science camp was another factor that increased excitement and interest in the project.

The project involved three phases; a pre-science camp phase. a science camp and a post-science camp phase. The pre-science camp phase was a time when the research team was assembled by the IPEB facilitator. Activities engaged in during the pre-camp phase include introductory meetings in which the project was debated by all the people invited to participate. A two-day workshop was also held to introduce participants to the concepts research, action research and teachers-as-researchers. It was at this workshop that teachers started brainstorming about possible research questions. The first reflective session was also held in which attempts were made to assist individual participants to clarify their research topics and to reflect on the practical situations in which their research was to happen.

Although the original idea was to have teachers engaging in action research activities, the practical situation demanded flexibility about the kind of research that teachers could do and a change in expectation about the level to which individuals could advance. After the first few meetings and workshops in which participants discussed the project and attempted to give it shape, the facilitators (including, and especially myself) came to a realisation that perhaps the original idea of action research had been too ambitious. We realised that before we could even begin to think of a specific type of research, we had to first deal with the concept of research in general as it was not familiar to the majority of the participants. We found it important to start by developing understanding on the initial processes needed to enable teachers to become researchers as this would be helpful in realising the aim of involving teachers in research. That means we had to be flexible about the rate at which individuals could progress and be flexible about the level at which they could pitch their research efforts.

The Science camp period lasted for a week and was held at the Umgeni Valley Nature Reserve in Howick. Attending the camp meant that everyone had to move away from their ordinary setting, that is the school, the university, and offices, and interact with others in a different environment. The IPEB science camp was in a sense a kind of retreat and in some ways similar to the Zanzibar camps, which Lange (1990:2) described as "a special

place, a safer place, where things can be tried, where there is no final selections or elimination going on, and where authority relations need not be maintained all the time".

Each teacher brought about five children from his/her school. The children were therefore from both primary and secondary schools and their ages ranged from 9 to 18 years. Like their teachers they were also from both urban and rural areas . Other full time participants at the camp included an Eskom official and two foreign observers who came with Lange, the main facilitator. One of them, Philip also had the task of video-taping events during the camp. All participants, especially the children were engaged in scientific activities centred around principles related to electricity and energy.

The teachers' roles varied at different stages of the camp. There was an agreement from the onset that all adults would make a conscious effort to monitor the way they interacted with children and that they would consciously attempt to change from their traditional patterns of interaction with the children. Teachers were also to continue with the research projects started during the pre-camp phase, or if they had not started, the camp was expected to provide an atmosphere that would enable them to engage in some research activities. At the least, the camp was expected to stimulate them into an inquiry mode and make them critical of their activities and especially their interactions with students.

The evenings were used for group reflections on the activities of the day. This included an analysis of the observations that each one had made about the scientific activities, discussions on the role that each one had played and the challenges encountered. The reflective sessions also provided a venue for reflections on teacher research, the extent to which teachers were doing research, as well as the challenges and constraints they encountered. The evening meetings were also used to plan children's activities for the next day. It was in this relaxed atmosphere, with no time pressures, that the adult participants could reflect on the roles they were playing in the camp as individuals and in their capacity as educators.

In addition to the interaction amongst teachers and between teachers and pupils, there were also interactions amongst pupils, interactions between pupils and other adults, interactions between pupils and the organisers of the camp, interactions between males and females, interactions between Americans and South Africans and interactions between the researcher and all other participants of the camp. The camp was therefore a very complex activity with very complex and sometimes highly charged emotions. It was at the camp that teachers found themselves forced to re-learn scientific content and in some instances to learn alongside their students. It was also at the camp that some teachers began in different ways to question the project, their roles in the project, the roles of the organisers and that of the American Professor who was facilitating the camp.

The focus of my research on teachers is, therefore, just a selection of what happened in the project, and even then a selection of some aspects of the teachers' lives in the project.

Several features of the camp were important for the research on teacher research. Firstly, it was a relatively constraint-free atmosphere. It was free of time constraints associated with schools, free of demands from authorities and free of demands posed by syllabuses and the way teaching and learning are organised in the school. It made it possible therefore to uncover constraints to teacher research, other those associated with school settings and the ways in which life is organised in schools.

Secondly, it was a place where teachers could interact differently with the pupils. The teachers and the learners could be engaged in learning situations together without any expectations for the teacher to teach, and no expectations for children to work on tasks that would generate right answers or correct understandings. It thus created an atmosphere where teachers could change from traditional roles and traditional patterns of interaction with students. It was an environment where teachers did not have to act according to power structures that exist in schools and classrooms. The teachers could also interact with both primary and high school pupils in the same room. They could interact with any child from any group, and at different educational levels.

Thirdly, the camp was an opportunity for the teachers to interact with each other for an extended period of time and so provided opportunities for collaboration and support to each other. It also provided all adults opportunities to interact in an informal setting, unlike the formal reflective sessions which were often straight to the point due to time constraints. The camp also provided opportunities for participants to reflect on individual activities, including their interactions with each other and activities specifically related to their research questions. The reflective sessions held in the evenings provided valuable data on the teachers' perception of their role in teaching and learning and this had implications for their role as researchers. Their reflections also provided insights about the ways in which teachers respond to unfamiliar ways of interacting with pupils. The teachers reactions further indicated some of the constraints and challenges for the process of becoming a researcher, which is an unfamiliar role that requires unfamiliar ways of interacting with pupils.

The post-camp period was a time to reflect on the processes of the project and to reflect specifically on the science camp and the impact it had on both the educators and the learners. It was also hoped to be a period during which teachers would go back to their respective classrooms and either carry on with their research projects, or if they still had to get started with research, go back with enthusiasm generated by the camp and undertake action research or teacher research activities in their classrooms.

3.2 Organisation of the research in the three phases

The researchers' interaction with all the participants and the manner in which they were sources of information was done at different levels. Firstly, the research focused on all participants in the team, investigating broadly the issues around interactions between the teachers and the non-teaching participants, especially the organisers, and interactions between the teachers and the children at the camp. The team provided insights into the ways in which the ideas of the project organisers matched or differed with the perceptions

and expectations of the teachers and how the contradictions affected the teachers' participation in the project and in research activities. This broader group provided pointers about some of the interactions and support mechanisms in the team which enabled teacher research and the factors which hampered or constrained teacher research. Those who discontinued their activities provided useful information relating, for instance, to issues of motivation.

Secondly, the research focused on all the teacher participants in the team and this group provided data on some of the issues and factors that play a role as teachers attempt to assume new roles. These were factors relating to the personal characteristics of individuals and issues relating to their roles as teachers. This level of research also provided information relating to how interactions between the teachers themselves can either enhance or constrain their efforts to become researchers. Emerging trends could be observed within this larger group and a more general picture built.

Thirdly, the research studied a smaller, subgroup of the research team, the language group. This group was constituted by three teachers and one subject advisor and the four were interested in issues relating to the use of language in the science classroom. Although they had slightly different interests, they worked as a team by way of planning together, discussing research questions and strategies together and exploring ways in which their projects overlapped and how they could build on these overlaps. The different members were also to serve as a support base for each other. I worked as part of this group assuming the two roles of co-researcher and facilitator. The language group, and especially the more active individuals received more support, in terms of the amount of time I spent with them, either carrying out my own research, or facilitating their research efforts. It was also in this group that I could monitor the roles I was playing at different stages of the research, and determine how I either enhanced or hampered the teachers' attempts to become researchers and to carry out research activities.

3.2.1 The pre-science camp phase

Information was obtained during this phase from written records of the observations made by the researcher as a participant in the meetings, interviews held with some of the participants and records of the perceptions and feelings of the researcher about events that took place during this phase. These records were supplemented by transcripts of audio tapes of the meetings and interviews. During this phase, research focused on firstly, the original perceptions of research which the participants came with into the project. For instance, what research is, how it is done, why it is done and the importance of engaging in research activities. Secondly, the research focused on what the teachers understood to be their role in research, what attitudes they had towards research and the challenges they anticipated for a researcher role. Thirdly, the research focused on activities that the teachers engaged in prior to undertaking research as well as situations in which they attempted to conduct research. The researcher also started at this stage to trace some of the issues which emerged about research from this initial and mainly introductory phase of the project.

As the teachers identified research areas, clarified these areas and attempted to narrow the research areas down to specific questions, the study on their attempts was guided by the following questions:

- what processes were involved in identifying the questions?
- what skills/knowledge were required to do this task?
- what help was required from others?
- what challenges did the process pose?
- How long did the process take?

Interviews were conducted with those who progressed beyond identifying research questions, to planning their research and attempting to collect data, to elicit information relating to the methods they had employed, reasons for their choice of methods, the kind

of information they were collecting, how the information was being recorded, the constraints they experienced as well as the challenges posed by their research efforts.

3.2.2 The science camp phase

The science camp was a good atmosphere for studying both the implicit and explicit assumptions, perceptions and ideas that teachers had relating to research and to teaching and learning. Observations were made as the teachers interacted with pupils, with other adults and with the researcher. Focus was also specifically on what research was being carried out, and what impact the camp environment had on these research activities. Another important area of interest was on the ways in which the teachers responded to a situation which required them to change the nature of their interactions with others around them. The evening reflective sessions were recorded both on video and audio tapes. Some emerging issues were followed up through individual and group interviews and these were also video taped.

3.2.3 The post-camp phase

Research in this phase involved mainly observation during a post camp reflective session and analysis of documents produced in this meeting and written by some participants as reflections on their experiences in the project and specifically the science camp.

3.3 Sources of information

3.3.1 Profiles of the Participants

There were eleven participants who served as the main source of information. This team included one INSET provider, a subject advisor and a resource centre co-ordinator. There were four female primary teachers, one female secondary school teacher and three male secondary school teachers. Three of the teachers came from semi-rural settings while the

rest came from urban areas around Durban. The group consisted mainly of younger (under 35) teachers with only two mature teachers (35 and older). The participants have been given Sesotho names for purposes of confidentiality. They were:

Tebello- a subject advisor who saw the research project as an opportunity to explore alternative ways for enhancing his skills in advising teachers and building good working relations with them. His special interest was in how teachers use language in science lessons. Tebello was studying for a post-graduate course at the time of the research and saw his research activities as good practice for research he might have to do in that course.

Morena - an experienced teacher, working as an INSET practitioner at the time of the research. In his capacity as both a teacher and an INSET practitioner, he had been exposed to various methods of INSET and had facilitated action research activities in some schools that he worked with. He was interested in investigating perceptions of electricity and energy which children bring into the classroom prior to instruction. He saw the research project as an opportunity to conduct research on a topic he had long been contemplating. He was also studying for a post-graduate course and wanted to use the research for study purposes.

Thabo - a co-ordinator of a resource centre whose job included co-ordinating schools in the vicinity of the resource centre and making resources available for these schools. His job put him in frequent contact with teachers, school administrators and parents, so he was interested in investigating the relationship between the school and parents in the running of schools, exploring ways in which the frequent conflicts between these parties can be resolved.

Mantoa - a primary school teacher working in a rural area. She was interested in exploring children's ideas in science, how these are influenced by their backgrounds and how she as a teacher can help the children. She later changed her research at the camp to

look at gender tendencies in activities that the pupils were engaging in. She was also studying part time with a college of education. She made no explicit connection between her involvement in the research and her studies.

Tsepang - a primary school teacher also teaching in a rural environment. Her interest was in researching gender issues in science teaching. Although she stayed in the project until the end, she made no attempts to engage in research activities.

Mateko - she and Tsepang worked in the same school. Mateko came later into the project and her interest was in researching urban/rural issues in the science curriculum that she has to teach. Although they worked together, there was no clear indication of collaboration between Mateko and Tsepang. Mateko later dropped out.

Lineo - a primary teacher, working in an urban environment. She came late into the project at the invitation of Tebello who needed a primary teacher to work with in his language research. She was also studying part-time at the time of the research, although she did not mention any intentions to use the research for her studies. She was particularly concerned about the outcomes of the research and was interested to know whether the findings would have any implications for the teachers involved in the research.

Lehlohonolo - a high school teacher who was interested in urban/rural issues in the science curriculum. In the initial stages of the project he was working in a rural school, but later moved to an urban school. He tended to be quiet most of the time, although not necessarily shy.

Sello - a mature teacher from an urban high school. He had prior experience with research through an overseas course he did a few years ago. He had extensive experience with INSET, had facilitated INSET workshops and had been a representative in his circuit. He was also studying part time at the time of the research and was interested in language issues in the learning of science concepts and the influence of pupils backgrounds on these.

Puso - a young science teacher who worked in a peri-urban high school. He was interested in researching language issues in science. His school was involved in riots and closed down for some period. He was highly active in other extra-curricular activities and he was also studying part time for a post-graduate course.

Malekhooa - an experienced teacher and a subject head of department in her school. She got involved in the research project after learning about it in a post-graduate course she was doing at the time. The research she conducted, on gender issues in science activities was used for study purposes in the post-graduate course. She is also a very active teacher, involved in several professional associations and in subject panels.

All the teachers in the team had gone through some in-service training and were already predisposed to thinking about change and innovation in science teaching. All of them, except two, came from different schools and so did not really know each other very well beyond meeting in INSET activities and other school-related activities. This raised a number of issues discussed later on in the report. This group was also drawn from people with very different academic qualifications.

3.3.2 Other sources of information

There were teachers who joined the project but later discontinued their participation. These teachers provided valuable insights with respect to factors that can motivate or de-motivate teachers to engage in research. They also provided valuable information relating to the perceptions that teachers have about research as well as the expectations that teachers have about the benefits of research and generally the benefits of taking part in projects that are concerned with teacher development and curriculum development.

Other participants in the project were non-teaching professionals such as Morena and Tebello, and they contributed valuable information relating to how teachers interact with other adults who are not necessarily teaching at that point in time.

There were also people who did not participate in all the phases of the project, but only participated in the camp. They include: the camp facilitator, Lange, Abigail and Philip who were observers at the camp, and Billy, the Eskom representative at the camp, as well as the 42 children who attended the camp.

Lerato - the IPEB co-ordinator of the project. Lerato occupied an interesting and sometimes contradictory role in the project, as an organiser, a co-researcher and a facilitator. Although she represented the interests of IPEB, she had to also be sensitive to the interests of the rest of the participants and act as a participant herself. The different roles were often confusing and unclear to her and she expected that, due to the collaborative and participative nature of the project, participants would clarify their expectations of her role. The other participants in turn expected her to clarify their roles as she was the initiator and organiser of the project. She was also the supervisor of my research.

Myself - my role in the project was also complex since it combined that of a researcher on teacher research, co-researcher in some of the teachers projects, facilitator and source of support for teachers who needed support, as well as part of the organising team. The different roles sometimes created internal tensions and were contradictory. For example, the researcher and facilitator roles created a tension between a desire to study the different stages of the teachers development towards a researcher role, and on the other hand a desire to see teachers actively engaged in research processes. I wanted to see progress in terms of research activities, yet at the same time teachers needed to be allowed to move at their own pace because it would be from this development that information would emerge about the conditions required for teachers to become researchers, how the process can be

facilitated and supported, and how long it takes teachers to assume their new roles as both teachers and researchers.

Being an inexperienced researcher and a teacher without prior experience of research in that capacity, I found it difficult to facilitate research by other teachers who lacked experience just like me. Yet they expected that, being based in the university as a student in a higher degree course, and as part of the organising group, I possessed knowledge and skills for facilitating their research. Being identified with Lerato, the organiser, also meant that I could only get information from some teachers through an intermediate person. It became very difficult at times to cut across the power barriers created by the perceived structure in the project and the hierarchies associated with this structure.

Furthermore, because my mother tongue is Sesotho and not Zulu, I had to be explicit about my intentions to understand conversations, otherwise I would have to piece together bits of the Zulu conversations into something sensible. This also meant that I sometimes missed out on the intensities and the cultural implications embedded in what was being said. However, some of this was made up for by having a lot of informal discussions with some of the teachers who were more willing to divulge such information.

The following activities served as formal venues and opportunities for data collection:

1. The first meeting where the main purpose was to explain the project and solicit participation from those invited. Information about the aims of the project and the assumptions of its organisers was also obtained from a project proposal outlining the rationale and intentions of the project.

2. A two-day workshop held to explore the concepts research, action research, teachers' involvement in research and the possibilities that it holds.

3. The first reflective session of the research team.

4. Plenary sessions and reflections between myself, Lerato and Morena.

5. One-to-one interviews with some of the participants.

6. Records of discussions and meetings with members of the language group, individually and collectively.

7. Interviews with some of the people who discontinued their involvement.

8. A plenary session held prior to the camp with the teachers, the organisers and the main facilitator of the camp.

9. At the science-camp; the reflective sessions in the evenings, observations of the interactions between teachers and pupils, interactions between teachers and other adults during camp activities and group interviews with different members of the research team.

10. Post-camp reflections by the entire research team, between myself and Lerato, between myself, Lerato and Morena and between myself, Lerato and Lange.

11. A Report from Lange to the CSD which includes a report on the IPEB science camp.

12. My reflective diary and personal experiences as a participant in the project.

Informal situations that provided more input and sharpened my focus on some of the issues emerging from the data included two sessions run with Mr Roger Deacon for Higher Diploma in Education students in the School of Education of the University of Natal-Durban (UND) and sharing my work in a discussion with a group of Master of Education students facilitated by Dr Muthukrishna in the School of Education.

3.4 Methodological considerations and Methods used

The theoretical framework adopted to guide this research is one that regards knowledge as socially generated by people engaged in social acts and takes into consideration the situation in which the action occurs. The view of this researcher is that ideas about change should genuinely address the concerns of people involved in situations earmarked for change, and should incorporate principles of equal participation, democracy and equality between those involved in the change process. It is also the view of the researcher that in processes of educational change, teachers need to play a major role as change makers rather than mere implementors of other peoples' ideas. Teachers should take the responsibility to change their practice and contexts in ways that bring about improvement not just in the situation, but also in their personal and professional growth. To meet this demand, teachers should be provided with opportunities to participate as professionals in collaborative curriculum development activities with other people who have an interest in educational change.

This research is thus influenced by the shared ideal of the practical and critical perspectives, that educational change should be a result of participatory and collaborative initiatives between teachers, teacher educators and departmental officials. Research conducted with the aim of improving teachers' practices and improving their professional capabilities should be conducted by teachers themselves. Teachers know their classrooms better than anybody else, so they should be an active part of any exercises of curriculum development. Through participation and by collaborating as a team with others interested in educational change, the teachers have opportunities to collectively analyse their experiences.

In the project reported here, there was an attempt to develop a participatory and collaborative approach to research and to make the research meaningful to all participants. The workshops, meetings and reflective sessions that formed part of the project provided

opportunities for analysis of personal and group experiences and enabled teachers to be critical of their assumptions and the practices informed by these assumptions. To make the research meaningful and relevant to all participants, everyone had opportunities to identify their own interest areas and to work on them. All participants had to individually and collectively make decisions concerning what research they would engage in, what resources they would need, what procedures they would follow, and what role other participants would play in their research. These aims of the project seemed in line with my understanding of teacher development as a responsibility of the teachers and as a result of democratic, participatory and collaborative efforts between teachers, teacher educators and even pupils.

Some of the questions and issues that I found important, and which I was constantly aware of during the research, related to the ways in which the research and the project as a whole could meet the ideal for teachers' training to be self-training, personal development to be self-driven and research to address genuine concerns and address specific needs. I was highly conscious of these issues and discussed some of the following questions with some of the participants as a way of consciously monitoring the direction that my research was taking, the direction that the project was taking and how the participants were playing a role in this. The questions included the following:

1. What mechanisms can we put in place to establish equality and maintain a spirit of partnership in the research team?
2. How do we balance the interests of the participants with the interests and constraints of the external agency that initiated the project (IPEB)?
3. How are we going to promote independent thinking and ensure that participants take responsibility for their own learning?
4. At what point does reflection become action research and at what point does research become action research?
5. Does teacher research always have to be embedded in the critical paradigm?

Some of these questions were addressed during the span of the research, and the project as a whole. Some remain un-addressed and are perhaps questions that relate to the whole critical approach to teacher development and questions emerging from practical situations which challenge the very assumptions of critical theories.

A qualitative approach was adopted for the research. This was in line with the theoretical stance adopted by the researcher which places emphasis on the importance of not only developing understanding of activities, but enabling participants to develop a good understanding of their activities and the thinking that informs these actions and also to take deliberate action to improve their actions and the situations within which the actions take place.

Hitchcock (1995) describes the following as some of the characteristics of qualitative approaches:

a) Qualitative researchers are concerned with understanding, interpreting and in critical paradigms taking transformatory action, rather than counting and measuring data. The research is not concerned with pre-formulated hypotheses, but with developing theories and action strategies grounded in the data.

b) Qualitative research focuses upon context, meaning, culture, history and biography.

c) Qualitative research is often concerned with a small number of cases, as it is important to understand fully the operating factors in the situation in order to not only describe, but improve it as well.

d) Qualitative researchers focus on natural ordinary and routine matters and on collecting data which is not heavily structured by the researcher.

Some typical methods of qualitative approaches employed in this study were, participant observation, interviewing, circulating questionnaires, keeping a reflective diary and audio as well as video taping.

The choice of a qualitative approach was taken in cognisance of some of the criticisms levelled against qualitative approaches. For instance, one of the criticism of qualitative research is that it tends to involve very small numbers of people and this raises issues of representativity and generalizability of findings (Burgess, 1986). Observation as a qualitative method is also typically confined to a specific setting, thus eliminating possibilities for comparison and contrasts (Guba & Lincoln, 1981). While the technicist researcher would be working towards establishing patterns that can warrant generalisations, the qualitative researcher on the other hand is interested in specific issues that relate to the specific people involved in the social act. The qualitative researcher's concern in that the exercise should generate information that is meaningful to those involved and to others in similar situations. The research reported here was not undertaken with intentions of finding generalisations, but rather, concerned with the quality of the issues being investigated. Furthermore, in order to develop understanding of the issues at play and in order to provide a conducive atmosphere for participants to undergo the professional development hoped for, it was important that a small number of people be involved.

Another criticism of qualitative studies is that, since they generate information that is often subjective and difficult to quantify, there are no easy checks on reliability (Guba & Lincoln, 1981). The position of the researcher was that individuals should empower themselves to become better professionals. The researcher considered understanding and meaningful change as more important than issues of reliability. Judgements about the validity and authenticity can best be made by those engaged in change processes themselves. Such judgements are made on the basis of, among others, the extent to which the research methods lead to meaningful change. As such they cannot be made outside the social act and the situation in which the act occurs. Furthermore, Guba and Lincoln (1981)

argue that issues of reliability and validity are misplaced in non-scientific oriented studies. The two authors suggest that these scientific terms should be substituted with concerns with credibility and 'auditability'.

Triangulation techniques were employed by the researcher, combined with regular reflection with other participants to check against biases and to take care of the validity and credibility issues. Cohen and Manion (1980:208) define triangulation as "the use of two or more methods of data collection in the study of some aspect of human behaviour (or social action and interaction)". These authors describe five types of triangulation, namely, time triangulation, space triangulation, theoretical triangulation, investigator triangulation and methodological triangulation. Time triangulation refers to a situation where a researcher wishes to rectify omissions due to the fact that studies are conducted at one point only in time, thereby ignoring the effects of social change processes. This can be done through either cross-sectional or longitudinal approaches. In cross-sectional approaches, data concerned with time-related processes are collected from different groups at one point in time. For instance, different categories of people were interviewed at the camp to determine the extent to which the pre-camp phase had initiated teachers into a researcher role. Both teachers who were part of the pre-camp phase and those who just came for the camp were interviewed and observed and their perceptions noted.

Longitudinal approaches, on the other hand, collect data from the same group at different points in the time sequence. For this research, the different points in the time sequence were the pre-camp phase, the science camp period and the post-camp phase, and data was collected from the same group at these different stages.

Space triangulation attempts to overcome limitations of studies conducted within one culture or subculture. Although issues relating to cultural differences were noted, little emphasis was placed on space triangulation as the study concentrated on teachers in their professional capacity and did not focus much on cultural issues. There were also issues emerging from the history of racial intolerance in South Africa, issues emerging from the

fact that the researcher is a Sesotho-speaking African rather than Zulu-speaking and that she was associated with the university, by virtue of being a post-graduate student. So cultural issues emerged, but these were not a focus of the study.

Investigator triangulation refers to the use of more than one observer or participant in a research setting. "Observers and participants working on their own each have their own observational styles and this is reflected in the resulting data and the use of more than one observer or participant can lead to more valid and reliable data" (Cohen & Manion, 1980:213). In this research, there were other non-teaching participants who served as both a check on the researcher and as valuable people for reflection on events that we had all participated in. This was the case at different times in the research.

Methodological triangulation refers to the use of different methods and can either be between methods or within methods. Within-methods triangulation refers to the replication of a study as a check on reliability and theory confirmation. This was not attempted in this research as replication and reproducibility may not have been possible and were not of major interest to the researcher. Between-methods triangulation on the other hand involves the use of more than one method in the pursuit of a given objective. This proved valuable in this research, which included among other things, obtaining people's perceptions about their roles and their feelings about the way they do their jobs. The interviews, participant observation, audio-taped information and some of the video material provided complementary insights. In some cases one method provided information which participants would not provide under different circumstances. For instance, some participants were more willing to talk about their perceptions and expectations than to write about them. Therefore, conducting interviews and taping these interviews provided this useful information which might otherwise not have been obtained.

Another limitation of observational approaches relates to personal bias which can be introduced by the researcher (Best & Kahn, 1986; Guba & Lincoln, 1981). Guba and Lincoln (1981) note that it is often difficult to guard against the intrusion of personal

biases, and attitudes, prejudices and assumptions in naturalistic inquiries. It was therefore important that the researcher remain highly conscious of her own perceptions, her own understandings and how these affected the other participants. Through continuous participation in the environment under study, researchers can become very familiar with the setting and may therefore make assumptions and take some situations for granted. As a result, some questions may remain unidentified and unanswered. This effect was minimised by employing a multi-method approach (Cohen and Manion, 1980) through the use of audio and video recording. The multi-method approach helped to bring to light some issues that might have been left unattended.

Another limitation of observation is that it is theory-laden. Best and Kahn (1986) warn that when researchers are sole observers, they unconsciously tend to see what they want to see and to overlook those incidents which do not fit their theory. The video tapes for instance provided a lot of information about the camp which indicated how the different teachers shifted from their original ideas about learning and about research and the role of the teacher in research. Without replaying the camp activities on the video, the researcher could have been unaware of this.

3.4.1 Participant Observation

Bernard (1988) describes four types of observational study, and these are represented in table 3.

Table 3: Different types of observational studies and settings

Degree of structure imposed on the setting	Degree of structure of observational setting	
	NATURAL SETTING	**ARTIFICIAL SETTING**
UNSTRUCTURED	Type: completely unstructured field study **1**	Type: unstructured laboratory analysis **2**
STRUCTURED	Type : structured field study **3**	Type : completely structured laboratory observation **4**

The study reported here could be taken to fall into category (2) except that teachers were expected to go back into their natural setting and conduct research there. Their concerns were still centred around their activities as teachers. The project created an artificial environment where many of the teachers' activities were not done in their natural setting, the classroom. The science camp was an even more artificial environment, specifically designed to be different from the school.

The choice of participant observation (Bernard, 1988) as an approach was based, in part, on an assumption that the information being sought would be generated through interaction amongst all participants in the research project, including myself. The approach of the researcher was that she would be an active participant in the generation of the knowledge being sought rather than an outside observer who maintains an unchanging distance from the setting and from the people in it. The researcher thus adopted a deliberative stance, "recognising that we always bring to experience frames of interpretation or schemata" (Wittrock, 1986:140). Furthermore, the researcher was conscious that her own interpretation of the setting needed to be subjected to a secondary level of observation and critique. Being a teacher, inexperienced in research like the other teachers, and being a participant, the researcher was not an outside expert, or even an

outsider looking into the activities of subjects of a study. Through participation, the researcher became a source of information, from her own attempts to do research and also a source of information on the dynamics of facilitating teachers' attempts to do research.

Through observation as a participant, the researcher obtained information about both verbal and non-verbal action. A non-participant researcher on the other hand, may miss out on some aspects of the social action. This observational method also allowed an in-depth study of the individual participants, as well as the collective team. It enabled the researcher to build a primary and informal relationship with the other participants, and this in turn provided opportunities to find out, in much more detail, what each participant in the study was really like and was really thinking and feeling.

One of the drawbacks to this approach is that participant observation tends to generate massive amounts of data and such data are often difficult to code or categorise in any systematic fashion. This was experienced in this research. With the deliberate attempt not to confine the study to fixed, well-defined questions drawn prior to the research, it was difficult to subject the information generated to techniques that confine it to very specific and clear codes and categories. It also appeared to the researcher that to do so would be to force the information generated to conform to pre-specified answers to the questions being asked. The research was also not guided by any hypothesis that was being tested, there were no clear variables to use in the generation of codes, and in fact in many cases there were issues that emerged which the researcher had not anticipated.

3.4.2 Interviews

Lofland and Lofland (1984) describe an interview, especially an unstructured one, as a "guided conversation whose goal is to elicit from the interviewee, rich detailed materials that can be used in a qualitative analysis" (p12). Through an interview, the researcher can discover the interviewees experience of a particular topic or situation. Unstructured interviews were chosen for this study because of their flexibility and informality. The

interviews were guided by a general set of questions. The group interviews assumed the nature of informal conversations guided by the researcher around pre-identified themes. It was important that interview questions remained flexible because the information sought varied from person to person. The flexibility enabled the researcher to change questions depending on the interviewee and as the situation demanded. The informality was necessary to create an atmosphere in which teachers felt at ease to divulge sensitive issues relating to their personalities, their beliefs, perceptions and attitudes. Unstructured questions, open to different types of responses, were used because these were more likely to provide greater depth of response and show differences in the way people perceived and felt about the actions they were engaged in. They allowed for deeper probing of issues. All the interviews were tape-recorded and some were video-taped. The tapes were then transcribed and analysed.

An advantage of the interview method is that, the types of information generated may be more than what an individual might be willing to put down in writing. As Best and Kahn (1986), note, "people are usually more willing to talk than to write" (p186). This is especially the case where the information is regarded as confidential or relates directly to the individual's feelings and attitudes.

While interviews can generate very valuable data, they are very time consuming. One-to-one interviews proved difficult in this research due to time and financial constraints and in some cases resistance by some participants. Therefore, many of the interviews were done in pairs and during times when the research team had to meet anyway, especially during the science camp. Group interviews proved helpful in the case of teachers who didn't want to be interviewed. In group interviews, the teachers who had resisted one-to-one interviews, were more forthcoming and more relaxed because attention was not focused on any one individual alone.

Additional advantages of group interviews highlighted by Lofland and Lofland (1984) include that the group interview allows people more time to reflect and to recall

experiences. Furthermore, something that one person mentions can spur memories and opinions in others. The group interview, allows people moments of silence and a time to listen to others, and this allows each person to rethink and amend any initial account that upon reflection, seems in need of amplification, qualification, amendment and contradiction. In a group interview, people might not agree with each other and this provides instances of interchange between contrasting perspectives, and enhances the richness of the information generated from the interview.

Although the advantages of group interviews discussed by Lofland and Lofland (1984) were felt at different points in the study, there were limitations as well. Firstly, it was not easy to satisfactorily follow up issues relating to specific individuals as a question could not be posed to one individual without eliciting responses from others. Perhaps this happened because they were all people from the same profession, who shared similar experiences relating to their work. Secondly some members of the group tended to just echo what others had already said. Some teachers tended to define themselves in terms of what the others perceived and what others felt was the right thing to do or to say.

3.4.3 Keeping a Reflective Diary

Being a participant in the research required that the researcher monitor her roles as co-researcher and as a facilitator. The diary was a useful written record of what happened, of my feelings and my attitudes at different points in the research. Diary entries were made after meetings, after workshops and reflective sessions. Entries were also made as reflections on conversations held with different people in other circumstances. At the camp entries were made every evening after the reflective sessions. It enabled reflection on assumptions and sub-conscious decisions regarding issues such as, how to relate with the other participants, when to maintain a distance and when to get close to the other participants. It also served to illuminate the path I had travelled in terms of becoming a researcher.

Keeping a reflective diary helped to check against personal bias and against allowing personal perceptions to dictate the path that the research should follow without due regard to what the other participants felt and were doing. It also helped to monitor tendencies towards assuming that actions and opinions that occurred frequently or came from the more active participants necessarily reflected the general perceptions and opinions of the other teachers.

3.4.4 Audio and Video Tape Recording

Audio taping was used for almost all the events that the team engaged in collectively; the workshops, meetings and reflective sessions. The audio tape was also used to record some of the meetings and discussions I had with individual members of the team, as well as one-to-one interviews. A total of twenty two audio tapes were produced. Video recording was done mainly at the camp, as it was an expensive resource and because at the camp there was somebody whose responsibility it was to capture the activities on video. The video tapes captured teachers engaging in learning activities with pupils, teachers reflecting on their roles at the camp and on their individual research projects, as well as the group reflective sessions held in the evenings. Eleven hours worth of video material was produced.

The advantage of these records, both audio and video, is that the information contained in them can be replayed several times to recapture specific events and analyse them. The tapes and their transcripts enable one to capture the essence of what people are saying, as well as what they are not saying. Because the incidents on tape can be replayed, the researcher has the opportunity to look, and listen more than once, regard the data from different perspectives and focus attention on different aspects. This helps to avoid making judgements about the data too soon and drawing conclusions too quickly.

3.4.5 Questionnaires

One questionnaire was designed early in the process and was meant to elicit information that would be used to build profiles of the participants. The questionnaire was given to participants who took it with them in order to respond to the questions and bring their responses later. It covered such themes as people's beliefs and assumptions and required critical self-reflection. Only one participant responded to the questionnaire, despite several reminders and requests for its return. Possible reasons for this include the reluctance of participants to put themselves through the uneasy process of self-reflection. It could be reluctance to writing things as opposed to talking about them. It could also be that the questionnaire was too long, and the nature of the questions problematic for the respondents.

3.4.6 Documentary Analysis

Several documents provided data and helped in the analysis of data generated through other methods. The documents include, a proposal document outlining the rationale for the project, several reports and discussion of the Zanzibar Science Camp Project, my own reflective diary and a report produced by Professor Lange for the CSD which includes the IPEB science camp.

3.5 Analysing the information gathered

Analysis of information and insights obtained from the study was done in two ways, as an ongoing process during the duration of the research and at the end of the information gathering phase. During the data collection phase, several practices of the researcher and the research team as a whole, enabled on-going analysis of the situation at hand. One of the characteristics of the research project was that of creating opportunities for reflection. The reflection happened at different levels. Individuals were encouraged to keep reflective diaries, or some other written record of their experiences in the project and feelings they

had during the duration of the research. Another level of reflection was in group situations where all participants had an opportunity to reflect on the general research processes in the project and also on their own research projects. The third level of reflection was between myself and different members of the research team, mostly with Lerato and Morena.

The reflections between myself and these two participants served a number of purposes. Firstly, they helped me rethink some of the research questions, clarify and modify them. They helped me rethink issues relating to the role of facilitators at different stages in the project. Secondly, during the reflections, other participants were able to point out critical issues that I had either not been aware of or had approached differently. They also highlighted some comparisons and contradictions that had not occurred to me. Thirdly, they served as opportunities to evaluate teachers' progress with their research efforts and to raise consciousness of needs that were emerging.

In addition to the reflections, I also kept a written record of my impressions of meetings and workshops. Reading through the diary helped me in identifying issues that needed attention. Keeping a reflective diary enabled me to have a record of my personal feelings, attitudes and ideas at different stages of the research. Reference to my diary and insights from other participants enabled me to detect trends both in my own research and in other participants' research efforts.

The post data collection analysis involved listening to audio tapes and viewing the video tapes. A process that Craig (1988f), calls "*immersion in the data*". This process helps to absorb the data and formulate a more wholesome picture of what has been happening during the entire process. The audio tapes were transcribed verbatim by the researcher and the transcripts became one of the major focuses for this phase of data analysis. Guba and Lincoln (1981) identify two stages involved in the analysis of interview data. The first is the analysis of the interviews individually in order to take into account the respondent's personal context, the possibility of respondent biases, the credibility of what has been

reported and the interaction process between the interviewer and the respondent. Each transcript was subjected to this type of analysis. In the case of group interviews and group discussions, the individual contributions were analysed separately followed by an analysis of the contributions as a collection in one transcript.

The second stage identified by Guba and Lincoln (1981) is the analysis of the interviews as part of a larger set of interview data, which is integrated to form the total inquiry. In this study, the analysis of interview data involved extracting from each transcript statements that responded directly to questions asked by the researcher and also answers provided by the respondents raising different issues or providing additional information related to the questions asked. These extracted statements from each interview transcript were then put together in one document and grouped according to the questions they responded to or the issues being raised. Categories of the main issues emerging from the data were then developed and the information from the transcripts categorised under these main issues.

The research demanded flexibility and, as a result, the questions asked varied depending on the participants, the situations in which interaction between the researcher and the participants occurred, and the need to probe certain issues. The questions were mostly open-ended, allowing teachers to expand and add issues that might have otherwise eluded the researcher. Measor (1985) points out that in unstructured approaches, especially interviews, the interviewee will inevitably 'ramble' and that rambling is nevertheless important and needs some investigation. Rambling refers to a situation where the interviewee provides information which is not necessarily relevant to the specific question asked, but which is of most interest to the person being interviewed. By allowing rambling, the researcher gets access to data that is central to the interviewee and which may in fact be more important than the questions being asked.

The open-ended and flexible nature of data collection led to a situation where information relating to one issue or theme was obtained from several contributions and situations. These included:

- responses to questions posed directly by the researcher,
- statements relating to questions posed by other participants during group discussions and reflections,
- statements provided by the teachers as information they felt the researcher and other participants had to know.

The information generated from all the contributions was then grouped under general clusters derived from issues emerging from the data. The clusters were not established *a priori*. Although the choice of approach was by trial and error rather than a result of deliberate adherence to a specific theoretical influence, it is, in some ways, similar to the analytic approach to data analysis described by Taylor and Bogdan (1984) in that, the data analysis approach adopted by the researcher was one that allowed themes to emerge from the data rather than force the data to fit into categories developed *a priori.* The process adopted by the researcher was one of "building types or classifications out of the data. These are built as one goes along, rather than being a priori" (Bulmer, 1984:251).

Data analysis sought to develop insights which are grounded in and developed from the data. Although this is similar to the approach of grounded theory where data generates theories, this study was not aimed at either making generalisations or developing theories. Instead the intention was to raise questions about teachers as researchers, and develop an understanding of some of the issues raised as they engage in this process. It was aimed at obtaining information about social perspectives, meanings and definitions.

The study was not concerned with generalisations nor even intended to be a representation of any sector of society. Nevertheless, the findings and insights are intended to provide information about teachers who share such similar educational backgrounds and personal qualities as those who participated in this study. The study is intended to provide insights on what happens when such teachers attempt to become researchers and to become directors of their own professional development. It is also intended to provide insights about issues that emerge as teachers attempt to become critical and reflective change

agents. The study will therefore provide insights for teachers who are interested in changing their practices and who wish to develop through their own efforts by engaging in teacher research. There are also lessons for teacher educators and institutions whose practices are geared towards the professional development of teachers and towards teacher participation in curriculum development. The lessons from the study will also provide insights about the potential for teachers to assume a researcher role, and what the starting point for such initiatives could be.

CHAPTER FOUR

INSIGHTS FROM THE STUDY

4.1 Introduction

In this chapter, the analysed data are presented. The data, although mainly derived from issues around teachers' attempts to do research, also include issues relating to the aims and assumption of the people who organised the project. There are also insights into the issues relating to the facilitation of teachers' research activities. This chapter also provides information about the teachers' perceptions of research and the role they saw for themselves in research. Their perceptions of their role as teachers and of alternative approaches to interacting with pupils in teaching and learning situations are also indicated. Some of the challenges and constraints that were encountered in the project and in research activities are highlighted. The experiences of the researcher as a participant, a facilitator and a researcher are also presented.

As the study was not aimed at quantification or comparison amongst the teachers, no attempts were made to establish the prevalence of different views. No attempts were made to determine priorities on the basis of majority opinion. The quotations and examples given in the data mainly serve the purpose of illustrating points and describing aspects of the situation. They may not be exhaustive and the teachers and other participants quoted may not be the only ones who expressed the particular view. The information has been presented selectively in that issues relating to the gender of participants, their age, educational qualifications and cultural backgrounds, even racial differences and attitudes, are not dealt with in great detail. Although noted and in some cases hinted upon, they did not form part of the major focus of the research. The teachers' prior experiences with research were not solicited for purposes of comparison between individuals, but rather for their usefulness in determining how their previous exposure or lack of it influenced their present attempts with research.

4.2 Previous experience with research

The teachers brought into the project varying levels of exposure to research, and with that varying levels of understanding about research. Their experience with research ranged from no experience at all, through involvement as a subject or informant, to having personally undertaken research before. The teachers' exposure (or lack of it) to research had both positive and negative effects on their attempts to become researchers in the IPEB project.

There were a few teachers who had no personal experience with research except in some cases having heard about it from other people. For example, Tsepang did not know what it was at all, Mantoa had heard the word research but was never involved in it, while Malekhooa had heard about research, and although she aspired to do it, had never been engaged in research activities. The second category is of teachers who had been involved in research as subjects of a study, for example studies done by post-graduate students, and in another case teachers had provided information and views for a research project run by an INSET organisation. There were also teachers who had previously carried out small scale research activities for academic courses.

Those teachers who had done research had been exposed to the scientific and applied science traditions of research where the research was centred around a pre-established hypothesis to be tested. They had been involved in quantitative rather than qualitative studies, focusing on quantity rather than quality. The methods they were familiar with were structured interviews and observations where the researcher is a distant and objective onlooker who is studying other people. They showed no knowledge of qualitative methods such as participant observation and approaches to research where the researcher himself could be the subject of his/her own study. They therefore expected their research in this project to be the same as that with which they were familiar.

All the teachers who had some prior knowledge of research tended to think of it as a specific type of activity which is done in a particular way. The particular approach to research was the formal, quantitative, objective and impersonal type. Thus, the prevalent view of research amongst the teachers was that of a formal activity which tests hypotheses that are defined prior to the research activity. When these teachers were confronted with a different type of research, which is less formal and uses different methods, they did not easily identify this as research. To them, it didn't feel like research.

In some instances, the previous experience of research enhanced the research agenda. It created an awareness of some methods associated with research. Those with previous personal experience had some understanding of how to go about doing research and they had an idea of what should happen to the data collected. They could formulate clear expectations of the research process and work out its personal relevance, for instance, some ways in which research can help one's career. Previous experience with research also created an appreciation of some of the challenges associated with research, such as that research is not a smooth, unproblematic process and that it is not straightforward and happens step by step. The participants, who were aware of the difficulties of research, accepted research as a process of learning which may not be linear. The teachers with no previous experience with research, on the other hand, tended to think more in terms of activities associated with INSET workshops and courses they had been exposed to. Their expectations were that the project would generate materials and activities to be applied in the classroom.

There were teachers for whom, previous experience created negative attitudes towards researchers. These teachers needed reassurance that the research reported here would be different because in the past their contributions were not acknowledged, and this made them sceptical about being involved in research exercises. Their past experience had created a perception of research as a process done on or using teachers, and not teachers doing research, so there were suspicions that teachers may be used as guinea-pigs to achieve certain undeclared purposes. In an informal discussion with an INSET provider

who was part of the research team, he felt that this was especially the case in the African teaching community, because,

> there was a time in South Africa when the black teaching population were a very fertile ground for research, and this has made people sensitive.
>
> (Research notes, June, 1997)

His words were echoed by a number of other teachers including those who discontinued their participation in the project.

The past experience of teachers as subjects of research, rather than teachers as active participants in research, had also socialised them into assuming passive roles rather than proactive ones. In some cases, they subconsciously acted in ways which supported this practice, without realising that they were hindering their own development. Their experience with research had created a perception of research as a process done by experts who are mostly people from universities or people from outside the school. This perception of research as an external activity, carried out by people who come from outside the school, was so entrenched that it was accepted as the normal way in which things should be. Although some teachers felt that outsiders may not know the classroom situation well enough to make judgements about what practices are appropriate, they were still prepared to let the outsiders assume researcher roles while they played supportive roles. They found it normal that it should be an outside 'expert' who assumes the researcher role, and that teachers' roles should be confined to implementation of recommendations based on the outsiders' findings.

4. 3 Perceptions of the research project

4.3.1 The organisers' perceptions

The project was formulated with the aim of investigating issues around teacher research and action research. The teachers and other participants involved in the research team were regarded as change agents, a view that recognises them as both designers and implementors of ideas for change. This is reflected in the IPEB document describing the proposed outline and rational of the Eskom Electricity and Energy Project (Raubenheimer, 1996). By recognising teachers as agents of change, the organisers of the project were also recognising them as active participants in the generation of knowledge about teaching and learning. The participants were expected to be active participants in the generation of educational ideas, activities and materials suitable for their contexts. Determining the contextual relevance of these ideas, activities and materials would be achieved through processes of research. For classroom change, teachers would be involved in research that studies teaching and learning activities and the situations in which the learning occurs.

The project also recognised the importance of reflection and exchange of ideas for learning. The organisers adopted an approach that provided opportunities for learning to be a social process, and a self-directed endeavour. For instance, evenings at the camp were reserved for reflective sessions where teachers could reflect on their activities and the lessons that were emerging out of the camp activities. A view of learning as a process that necessarily involves reflection was adopted and a need identified to create environments that are conducive for experimentation, learning from action and being engaged in reflective exercises. In the IPEB proposal Raubenheimer (1996) indicates one of the aims of the project as the creation of environments where teachers could feel free to experiment and make mistakes in open and reflective forums. The proposal further indicates that a dialectical relationship would be built between teachers and other change agents like INSET providers and departmental officials concerned with the production of

knowledge. The camp provided these opportunities and environments. It was designed with the intention of being a venue where,

> change agents (including teachers) will work with children so that they can discover good practice for themselves, with help and guidance from the camp facilitators. In this way, theories about how children learn, about the nature of science, about the ways to include more relevant curriculum emphases and so forth will evolve out of the camp
>
> (Raubenheimer, 1996:4).

The camp also provided information about how the teachers generally responded to the ways in which interactions occurred between them and the pupils, between teachers and the project organisers and between teachers and myself as a researcher and an African who does not speak the predominant language in the group, Zulu. Issues relating to race and gender also emerged at the camp. These are important issues for any initiative with a multi-racial and multi-cultural composition, as was the case in the IPEB project. These issues are especially important in South Africa, which is just emerging from a deep culture of intolerance. These issues raised challenges for facilitation where facilitators themselves were fully involved in the project and some of the issues emerged as personal and directed to specific individuals.

A collaborative approach between practitioners and other role players in education was adopted in the project. A research team was assembled to enable this collaboration. An assumption made by the organisers was that the participants would take part in the project activities on the basis of mutual trust between everyone and as equals. This excerpt from a transcript of one of the reflective sessions demonstrates Lerato's expectations to this effect,

> I think my expectations have been that we are here as co-participants, to develop trust and respect amongst each other as equals, on an equal basis.
>
> (Transcript of the two-day introductory workshop)

Based on this expectation for participants to act as equals and partners in the project, she expected that the team would give her guidance on what her role should be, and clarify for her whether she was supposed to be a facilitator, a co-researcher or a chairperson. The organisers also expected that all participants would take responsibility and control over not just their individual research exercises, but the project as a whole, by being part of the processes of shaping the project, monitoring the direction of developments in the project and taking action on the basis of these developments as a team. It seems that an assumption made by the organisers was that shared control and partnership between the teachers and organisers encompasses sharing responsibility for the success or failure of the project. Another assumption was that organising activities in the project would not necessarily be the responsibility of only one person. For instance, the project atmosphere was intended to be such that all participants be free to raise issues for discussion, and to initiate meetings and discussions. A further expectation was that, a collaborative approach would help in creating a feeling of ownership over the project. It was assumed that ownership would increase levels of enthusiasm and motivate the participants to engage in research activities.

The project and the teachers' research processes were approached from a view that acknowledged the need for flexibility about the things being done and about the direction of the activities. Lerato felt that although she, as an individual, is someone who likes to plan things very carefully and know exactly where things are going, she realised that the project required her to adopt a different approach, that is to be quite open, flexible and allow emerging issues and trends to determine the direction of the project. The project had, at the same time to be responsive to the ideals and interests of IPEB. One of the challenges for facilitation was therefore, finding ways to maintain a balance between the interests of the participants and those of IPEB. A need was identified to establish a balance between allowing the process to be flexible and to allow development in the project to determine the direction of activities. On the other hand, participants especially the organisers, had to accommodate IPEB's interest in how children learn and the desire

to engage participants in situations where they try to make what the children are learning more relevant to them, to the world and to their larger society.

While the organisers acknowledged the need for teachers to be initiated into research through some form of training, they rejected an assumption of learning as a direct result of teaching. Therefore, although the teachers were briefly provided with some formal introduction to research to prepare them, the bulk of their learning about research was expected to happen as they engaged in research activities. The approach adopted was that of learning through doing as opposed to learning according to specific pre-determined guidelines. This approach emphasised 'on-the-job' training, where the participants learn about research through exploring the processes of research and become researchers by discovery. The process was to be open and flexible, where the facilitators were not directing activities towards pre-determined goals, but rather responding to needs as they emerged. They were to provide information as it was needed, including questions on research, and methods used in research. Lerato indicates this in the following statement she made in response to a question about the assumptions she had as she assembled the research team,

> the process emphasis that I have adopted, as you have already said is non-directive, its feeding information as people need it, not presenting them with research methods up-front, presenting them with research methods as they need them. I tried to work through that dialectic.
>
> (Transcript of a reflective session between Lerato, Myself and Morena)

The camp was seen by the organisers as the main event of the project, but it was also to be an eye-opener about the different ways in which teachers can interact with pupils. It was intended to present situations where teachers feel challenged to critically examine their assumptions and beliefs about how children learn, how teachers develop as professionals and how teachers can either hinder or enhance learning through the way they interact with others. It was also intended to create opportunities for teachers to be self-critical, identify areas for growth and work on developing these aspects of their profession. They would

have opportunities to be directors of their own learning and their own professional development. The reflective sessions in the evenings and the agreement reached by all to consciously monitor the ways they were interacting with students and to critique and discuss these as a team, was one example of how the critical skills were to be developed. This would also provide opportunities for teachers to consciously monitor their practice at all times and to trace changes they were experiencing.

The research process was meant to be something different from the traditional INSET that the teachers were used to and was expected to promote teacher independence. It was also hoped that the teachers would perceive it as such. Instead of teachers fitting into pre-designed roles and engaging in pre-designed activities, the teachers would have to exercise their own judgement and make decisions about the roles they would play at different moments in the project. They would also make decisions about the research they wanted to engage in. They would determine the research topics, decide on what methods to use and seek help where they needed it. When support was needed it had to address the specific needs of the teachers.

4.3.2 The teachers' perceptions

Since the teachers were invited to participate in the project, they came with expectations to find a well defined project. They did not expect to be part of the process of planning the project and giving it shape. They expected a pre-planned process with a well-worked out programme and well-defined roles for participants. Lack of this clear plan and programme was interpreted as a weakness, rather than an opportunity to participate at all levels of the project. An example of this interpretation is given by Sello who also shows how his decision to stay on was based on a shift in perception to one that recognised that the organisers did indeed have a direction, although the direction manifested itself differently from what he expected to find. The following statement obtained from a transcript of an interview conducted with him indicates this. He reiterated the same feelings in a later reflective session involving all the other participants.

> At first I doubted the project and thought it was not going to last because it sounded like people who were just coming up with ideas, it appeared direction-less. I later realised the potential of the project and I decided to stay because I realised these people (organisers) know what they are doing.
>
> (Transcript of a reflective session held during the camp)

For those teachers who had no experience at all with research, the initial expectations of the project were that it would be another INSET exercise and they expected it to be run like the INSET they were familiar with. The planning sessions and discussions held by the team were interpreted as a waste of time. In some cases the meetings and discussions were interpreted as 'reporting back', and seen as the organiser's way of checking on them. This created anxieties. These teachers also expected that the project would produce the products they associated with INSET. Their initial expectations were that they would be taught how to teach better, and provided with skills and suggestions of the best ways of teaching, For example, Lineo expected to gain "skills to teach pupils real science" and Mateko expected that "after the research I will be able to use projects with pupils". They also expected to receive activities to use in class and to participate in developing materials for the classroom. Although for some teachers these expectations changed with time, some discontinued their participation when the project activities did not match these expectations.

The teachers saw the camp as the central event in the project and they geared their activities towards that. The science camp became the peak of the project and for most, the end of their activities in the project. In fact, only two teachers remained enthusiastic after the camp and still persisted with activities related to the project and research. The teachers' experiences in the project were described more in terms of what happened at the camp, and less was said about what was happening to the teachers prior to the camp. Their emphasis was on the exciting activities that the children were engaged in, interesting things learned about scientific principles or the way children were engaging with the scientific principles. It appears that the important thing about the camp for the teachers was that it was an opportunity for them and their pupils to learn new things about science.

Its importance was seen in terms of what it was providing for the pupils and how teachers learned to make learning more exciting for the pupils. This was more important than a focus on the teacher as an individual and a reflection on what was happening to him/her.

The fact that the camp was a one-off peak, an activity that was the ultimate height of the project, seems to have exhausted the teachers' energies and played a role in the lack of continuity in the project afterwards.

4.3.3 The teachers perceptions of their roles in the project

As the project was intended to be a collaborative exercise between the teachers and the organisers of the project, issues of control and the role that teachers played in the control of the project were important. Ideally the teachers would assume significant degrees of control on not only their research exercises, but the project as a whole. In the initial stages, the teachers tended to perceive their role in the control of the project as secondary. They expected that the facilitators would be the ones 'driving the bus' (McNaught C and Raubenheimer D (eds), (1991), while the teachers played supporting roles. For instance, in the two-day workshop in which participants had to answer questions relating to control of the project and of their research, the views of the teachers were of the nature reflected in the following statements,

> at this stage the organisers, but some form of commitment should be established from other participants. Once the project takes off, all of us will be driving the bus,

and

> there must be a facilitator, but all participants should contribute,

and

> there is a need for a leader, someone with initiative...but if only one person is driving the bus, the others relax, so full involvement of all participants is a priority.

The teachers' role is portrayed in all the answers in terms of contribution, commitment and involvement, but there must be a leader, a facilitator and those who initiated the project should assume the leadership role. While these perceptions were elicited from the two-day workshop held at the very beginning of the project, the tendency to expect directions from the facilitators and the expectation that facilitators are well placed to assume control persisted (as indicated in the video material taped towards the end of the camp and in the transcript of the post-camp reflective session). During the early stages of the project, the teachers were highly conscious of the project as initiated by someone else, and not them. It was much later, towards the end of the camp period, that some teachers started to question their roles in the project. Even then the challenges to the way things were happening in the project, emerged as emotional charges against the organisers for what the teachers saw as inadequate organisation. In general the teachers saw their roles in the project in broad, non-specific terms, such as to promote research, to make change possible, and to meet the objectives of the project. They were seeing themselves as implementors, guided by what the organisers perceived to be their role. The following examples taken from transcripts of reflective sessions held at the camp highlight this expectation of externally defined roles and the facilitators as the ones to define roles,

> Malikhang was saying that they were sort of feeling uncomfortable not to know what their specific role should be, I believe she had already picked up a specific role that they could play as teachers, but they didn't get a pointer as to how to play that role,

and

> people were left to just take the process (forward) themselves, but they sat and were expecting that either Lerato, Kuena or somebody would say to them now is time for that or this.

When the facilitators and the organisers did not perform these duties and when they acted in a different manner from the expected, teachers found the situation confusing and some

experienced frustrations. For instance, Sello experienced frustrations with the uncertainty about roles and expected somebody to tell him if he was being what he was supposed to be. This is reflected in a taped statement he made during one of the reflective sessions held at the camp.

> I really cannot say clearly whether I am doing the right thing or not, so I still have many questions, I am not sure whether I am doing the expected thing.

The organisers and facilitators were expected to provide a clear direction of where the project was heading. They had to anticipate issues and changes that emerged from the process, communicate these to teachers and provide direction as to how teachers should respond and change accordingly. However, the nature of the project, especially the camp, was that there were no predetermined changes and directions, and it was evolving as people were engaged in it. An explanation from the facilitators that they were also experiencing the changes for the first time, and encouraging teachers to make their own judgements about how to handle the changes, was not regarded as a satisfactory intervention. The facilitators were expected to give teachers solutions and not just make suggestions, suggestions were not perceived as helpful enough.

Another example of the expectation for definite and specific solutions is that of a teacher who managed to get started with research activities and was experiencing problems in deciding what activities to do and what questions exactly to ask for the research. The expectation was that the facilitator would provide solutions on how to overcome this, but the facilitator could only offer suggestions, but he thought that was not enough so he kept asking what I really thought he should do.

In another reflective session, Mateko described her dissatisfaction with the way in which the interaction between herself and the facilitator, Morena, had occurred, and felt that Morena needed to visit her and tell her how to handle problems,

> Morena hasn't been to see me and I wish he could help me out and tell me how to tackle specific problems and tell me what I can do when I encounter problems and whenever pupils have problems.

4.4 Motivation for participation

A number of factors played a role in motivating the teachers to be involved in the project. Information obtained from the tapes of an introductory meeting at the beginning of the project, and in a later reflective session indicates the following as some of their reasons; an interest in research and the researcher role, an interest in getting exposure to research, as well as gaining experience of what doing research involves. For example, Lineo explained that she,

> did not have any prior experience with research before this one, so when (she) discovered it was for researchers, (her) interest was aroused.

Other teachers indicated that they just wanted to join a team of researchers and be part of a research project. For example, Tsepang just wanted to "join other researchers" and Mateko wanted to "move with the project". For these teachers the idea of research was intriguing enough. Although they had no clear personal ambitions that could be addressed by participation in research, the idea of being part of research was interesting enough and they were ready to take things as they came. In fact, although Tsepang stayed for the duration of the project, she did not carry out any research activities of her own and didn't move beyond identifying a group of people that she wanted to work with. She showed little indication of change from being an interested party to being an active change agent.

Another question addressed in the pre-camp reflective session concerned the factors which the teachers felt were responsible for their continued participantion in the project, or for those who were new, important for continued participation. The responses included, supportive colleagues, a principal who encouraged participation and was excited about the

project, commitment given by organisers of the project to acknowledge teachers contribution, even in writing, and the anticipated benefits for the teachers' pupils. The last factor, doing it for the sake of pupils, emerged again later on in the last reflective session held during the camp period. In this case, participation for the sake of pupils tended to be used as a means of filling a gap created by unfulfilled expectations for material gains from the project. In a video-recorded interview with Mantoa, she indicates her expectations for monetary rewards, in the absence of which she resolved to do it for her pupils,

> at first I had the expectation to get money from the project, but when I realised this would not be case, I decided to do it for experience and learning and for the sake of the pupils, the camp would be a good place for them to learn freely with all the materials, so why not do it for them.

The experience and learning regarded by the organisers as one of the major goals of the research project was for the teachers a secondary issue. The main interest for them was in something tangible, such as remuneration or certificates that can be used to get promotion, which ultimately results in increased income. Resorting to participation for the sake of pupils did not address this need for material gain and the issue emerged later in the project as one of the sources of conflict between teachers and the organisers.

In one case, the teacher derived his motivation from his view of himself as a partner in the research project. This served as motivation for him to go on, to initiate research activities and carry out his own research. This teacher is also one of the few who were able to link the research to their practice and who believed that engaging in research activities could enhance their job performance. He felt that being part of a team, his activities had a bearing on the activities of the others in the team.

Some of the teachers who were doing part time studies, were interested in research because they could use it later in their studies and because they believed the experience would improve their curriculum vitae and enhance their chances for advancement up the professional ladder.

4.5 Perceptions about research

4.5.1 The nature of research

The teachers held a view of research as an abstract and external activity which requires one to go out somewhere to do it. They also assumed that in order to do research, one has to be objective and maintain a distance from the situation being studied. The teachers felt that in order to make observations, they have to withdraw from the activities in the classroom and observe as outsiders. The reason given for this was that when teachers are in charge of the activities they become very busy being in charge and do not have time to observe what the pupils are doing and what learning is going on.

There were also perceptions of research as an activity that involves theoretical as well as practical aspects. The link between the two is that theory informs practice, while practice is an application of theory. However, even though the two aspects are related, they were seen as distinct from each other. A transcript of the pre-camp reflective session, provides statements like the following made by Lineo, which indicates this distinction between theory and practice,

> yes, (action research) is possible, yes it does (work) because we have done it under PSP... but when you go alone to the classroom, it is where you find out that it was okay in theory, but practically, it does not work, but if we go out and practice it with children, at school, it's where you can see that its wrong here, we must change here, we must approach it this way.

Most of the teachers associated research with people in tertiary institutions, and the teacher's role in research was seen as that of a subject of study or implementor of research outcomes. In situations where a teacher is engaged in research activities in the classroom, that research was seen as basically, research about pupils, the ideas that pupils have, and their problems. It becomes a process of determining ways in which the teacher can solve the pupils' problems. The pattern here is that, research is done on another person, research

is not known as a process of self-study and self-reflection. If it is not done on teachers it is done on pupils. Examples of the teachers' descriptions of their research projects highlight the view that they had about their role in research vis a vis that of pupils and the purpose of research in their classrooms. In an interview with Sello he said that he is,

> focusing on how children use language...what I told them was that we are trying to help them learn science more effectively, so I am going to listen to the tapes and come back with something interesting to help them learn science.

In the pre-camp reflective session, Mantoa described her project as follows,

> I'd like to see the problems that children have in science as a subject and the way they see science...and the problems they encounter and what can be done to address those problems.

The general view was also that problems are located in children and that the teacher's duty is to examine the exact nature of these problems and then solve them. For example, the following is an extract from a transcript of the pre-camp reflective session, in which Mateko described her research as follows,

> I had a problem using projects, I am teaching geography and these people don't know what a project is and my involvement in this will help in using projects with my pupils, so I think I could show them that this is a project and we go like this when doing a project.

The perception here is that the fault/problem lies with the pupils. They are the ones who do not know what a project is. Her approach to the situation does not consider the possibility of the problem emanating from how she, as a teacher, has been presenting or introducing projects to the students. A contradiction in her statement is that she believes that she also has to learn how to use projects. But true to the traditional role of a teacher, once she knows, she will go back to tell her pupils and show them how projects are done. Even for those teachers who believed that research has to do with the interaction between

teachers and pupils. the role of the teacher in this interaction was to determine problems that children have and then act on these. The teachers did not expect their role to change, they expected that they would still play the roles they are used to. This was especially visible at the camp. For instance Refiloe understood research as a process that focuses on interactions between teachers and pupils, his view was that,

> research is about the interaction of students and teachers, the moment they come to us, we are able to say oh, there are problems.

The views of how research is done, and the description of what happens in a research process, points to knowledge of a specific type of research, the scientific or applied science approach to research, which views research as a process of generating information by investigating hypotheses, testing ideas, and testing instruments used by others. It involves collection of information with the intention of making suggestions or lobbying authorities for change. Thus, the predominant perception of research located it in an empirical-analytic paradigm. The research assumes a very instrumental and functionalist purpose. The generation of information and the use of that information were seen as distinct processes carried out by different people.

The research techniques identified by teachers include, questioning other people using questionnaires and interviews, and observation. They perceived observation done as part of research differently from observations a teacher makes while managing classroom activities. While the teacher may actually observe certain important aspects during students' activities, these are not recognised as observation in a research way. The following statement made by Lineo in a reflective session at the camp illustrates this point :

> I wasn't clear what to observe, how to observe and who to observe

but later on, in the same reflective session, reflecting on of the same situation in which she felt she didn't know what to observe, she goes on to describe some observations she made during the activities of that day,

> one thing that I observed was that with some children, its not the lack of the vocabulary or what, in the earlier days they had confidence problems...the other thing that I noticed was the language problems even with us as teachers, at times we were not clear enough, we were not giving clear enough instructions to the children.

So although she did actually observe children and teachers, and observed what problems were existing and the nature of these problems, the observations were not recognised for what they were, observations relevant for her research on language issues.

4.5.2 The purpose of research

Apart from its use in the classroom as a tool that highlights students' problems, research was recognised as a process with the potential to bring about change, to transform and improve situations. The change was described broadly in terms of changes in systems, in policy, in planning and in the society at large. It could also be change in the subject content or change from old teaching methods to new strategies. The broader change is seen as the responsibility of authorities in the education system, and the teachers feature in the change processes only when they bring about change in pupils or when they change from old to new teaching strategies. This change of strategies, viewed in the light of research as a process done by outsiders and teachers as implementors of research findings, means that the change in teaching strategies is really an implementation of suggestions for change, and not necessarily a result of a realisation on the part of teachers of a need for change. The teaching methods and the decision to change them originate elsewhere and not from the teacher.

The relevance of research in the classroom was seen in terms of tangible outcomes such as documented activities and recommended strategies that teachers could use. A video of an interview conducted with Lineo provides statements to this effect . She expected to gain skills to teach her pupils real science, and these skills would result from involvement in

research. A transcript of the pre-camp reflective session also shows statements indicated that Mateko felt that after the research, she would be able to use projects with her pupils. The relevance of research to teachers as professionals was viewed in terms of some tangible material gains for teachers who participated in the project. They expected monetary rewards, certificates, publicity and acknowledgement in documents reporting the activities of the project. They perceived professional development as promotion, rather than gaining skills to exercise improved professional judgements, growing as an individual and engaging in on-going reflection of one's practice, or on the basis of critical analysis bringing about improvement in one's practice.

The expectation for tangible, material and short term rewards was the decisive factor for some teachers on whether to participate or withdraw from the project. In an interview with one of the teachers who withdrew, Tsepo, she had this to say,

> I know how to do it (research), but the problem is that I don't really have time, we need to get time somehow and time is money.

In fact, despite later attempts on my part to re establish contact with her, she didn't really take part or engage in any research. The main issue seems to be around the incentive to do the research, and the incentive had to be money.

Among those who continued, expectations for material gains played a major role in determining the level of activity and the motivation to engage in research activities. Their feelings were strong on the need for material gains because the material benefits were considered more important than the learning they recognised as inherent in the activities they were a part of. In a highly emotional reflective session at the end of the camp, Lehlohonolo, pointed out that,

> as a teacher, when I do things, I always consider that I am a teacher, there are certain things that maybe I will benefit, is there anything I will gain in this particular research.

This statement made by him later in the same meeting gives an indication of the kind of benefits he had in mind,

> if I see that maybe at the end of the day, there is something that I will gain, like for instance if you say that we are being sponsored by ESKOM, then I will expect that at the end of the day maybe my school will benefit, maybe they are going to build a laboratory for us.

4.5.3 Conducive conditions for research

The teachers felt that research required an environment that is conducive and that it requires that teachers possess certain abilities and skills. They considered it important that teachers be equipped with observational skills to enable them to know what to observe, how to observe and to make decisions about who to observe. They also identified a need for teachers to be trained and given guidelines on how to do research. The training was to happen before the actual research exercise, and was not viewed as training happening 'on the job', or as learning through doing. In an interview with Thuso, in which we were trying to reflect on the activities of the camp and the teachers research attempts in general, she wanted to know how the teachers were prepared for the researcher role. Her question raises a number of issues about the nature of the preparation for the researcher role,

> when you expect them to do a research, do you prepare material for them, what are they supposed to work on, are there questionnaires...were there categories that they were supposed to choose from?

Thuso, is a former teacher, now working as a subject advisor and one of those who could not continue with the research. The question helps to indicate the type of mental framework that underlies the idea of training before doing research. Teachers are used to formal training, where there are ready-made materials for them to use or test. This gives them a perception of training as an activity done prior to practice. They had not been exposed to a situation where learning happens during, and as a result of practice. The call for training was made in this context.

Another quality identified as necessary for the researcher role is the ability of individuals to exchange ideas with others. The teachers felt that they needed to have the ability to find out what other people have done and to be able to discuss other people's work and compare this to their own. The exchange of ideas envisaged here is a two-way process, different from the one-way teacher communication they were exposed to as learners and which they mostly do as teachers. They regarded exchange of ideas between teachers and other adults as important. Developing the ability to do so was one of the changes most appreciated, especially by the primary teachers. They felt that the discussions and reflections had given them confidence to sit around a table and engage in debate with other people. This is something they had not done before and which they did not think they could do.

In one of the reflective sessions at the camp, there was a realisation by some of the teachers that the researcher role demands that the teacher be independent, self-driven, goal-oriented and self-motivated. These teachers recognised the need for these abilities recommended that all the teachers attempt to develop such abilities. They pointed out that, the students were increasingly becoming confident and independent because they were goal-oriented. Refiloe recommended to the other teachers that they should learn from the students,

> that's what we should be, goal-orientated, we have some targets, what is it that we want to achieve at the end of the day...how far shall we push it together and how far shall we interact with the students.

The other teachers on the other hand were feeling frustrated and directionless, because they were not working towards any clearly defined personal goals. There were feelings also that the teachers in their individual capacities needed certain qualities to be able to do research. They needed to be dedicated to the course and be patient about the ways things were unfolding in the research project. They needed to be willing to learn. They also needed to be flexible and acknowledge that research can take different directions, and

expose even things the teacher may be uncomfortable with. Teachers also needed to be able to withstand pressure and withstand moments in the research process that subject them to unwanted pressures.

Apart from the qualities that relate to the nature of the person, teachers felt that in order to carry out research processes, climates had to be created that are conducive for research. Conducive climates include situations which allow the teacher to withdraw from the situation and observe as an outsider. The argument was that when the teacher is in charge of student activities, she becomes very busy being in charge and does not have time to do research, or observe what pupils are doing. In other words, the climate of the classroom must be such that the teacher can at some point become objective and distant from the events taking place in the classroom and dissociate himself or herself from the activities under hand.

Transcripts of the reflective sessions held at the camp show that many of the teachers felt that they needed to be in control of the situation in order to do research. For instance in the following examples, the teachers claimed they could plan their research better and facilitate the children's activities better when they were in charge. Lineo was one such teacher and this is reflected in the following statement she made,

> On Monday, I was in charge and I told myself that in my research, what I will be able to do is to observe...I was able to channel my research

Malikhang echoed the same feeling,

> that's it, we were sure of what we were doing, we were now involved with children as facilitators, not lost as we were on Sunday.

A contradiction of this position is that, although they believed that it is difficult to do research when in charge of students activities, their perception of control encompasses taking charge of learning situations.

In line with the need to be in control was a call for teachers to possess prior knowledge of the children's activities and their intended outcomes. The teachers believed that this helped them to plan their research. Their argument was that having prior knowledge helped them know what role to play. Lineo elaborated the point by comparing the situation where she did not know before hand what was going to happen, and a situation when she was in charge of students' activities with another where she was not. The following extract from a transcript of one of the reflective, is a statement by her making the comparison,

> I had that feeling that, okay, now I have come here with children, I as a teacher, I don't know what is going on, I don't know the immediate objective, and the ultimate aim, I am totally lost...If I knew everything I would be knowing what is going on

and after taking part in the running of the day's activities she said,

> when we went to prepare for the next day, then I became very much aware of the role I would be playing the following day and who I am, because the mere fact that you don't know who you are causes a lot of confusion...Monday's project was quite easy, because we knew before hand that really what are we here to do and how far should we intervene, what is required of us.

So, they conflate their teaching role with their research role.

Another factor considered important for the creation of conducive environments for teacher research is a flexible management style in a school. Teachers felt strongly that school management should give some responsibility to the teachers and create environments where teachers feel free to try new things out and adopt experimental and inquiry approaches to their teaching.

On the issue of whether individual or group approaches were more conducive for teacher research, many teachers responded that the group or team approach to the research was very beneficial to them and that the group provided a forum for them to engage in debates.

In the process they learned about research, about teaching and about children's learning. The group was also perceived as a support base where participants could get technical, professional and moral support. In many cases teachers felt that the group atmosphere boosted their confidence about their capacity to do research, since it was made up of people who possessed differing levels of knowledge about research. Therefore they could all learn from each other. They pointed out, however, that for the group approach to work, the group must create an open-ended and democratic working atmosphere. Individual members must be committed, reliable and consistent in their research activities. It was also found important that the group should communicate frequently as the communication was a constant reminder of the course being chartered and through communication people could reassure each other and re-motivate those who have lost excitement.

Other concerns that were pointed out which relate to how conducive climates can be created, included suggestions about the organisation of the research project, and the way in which time is organised. The teachers felt that the process of research needs to be broken down into several components which are easily manageable and lead to the achievement of immediate goals. In a group setting, the recommendation was that the group has to set clear targets and agree on a specific time period for the attainment of these targets. They felt that the time needs to be carefully budgeted to suit the needs of all participants.

4.6 Perceptions about roles

4.6.1 Teachers perceptions of their roles in interactions with students

To be able to know what is required to facilitate a changing role for teachers it was important to find out how they perceive their role as teachers and how they feel and justify their present roles in teaching and learning situations. Information to this effect was obtained by analysing transcripts of all the reflective sessions held at the camp. Some of the issues were repeated in follow up interviews conducted at the camp which were video recorded. The statements provided below are extracts from these transcripts and clips from the video material. The teachers defined their roles in terms of what they do for their students. Teachers possess knowledge which they pass to students. If they do not have this knowledge, they will go out to get the knowledge and then come back to the classroom to pass it to their students. The case of Mateko is one such example. She felt that both she and her pupils did not know how to use projects as a teaching and learning strategy. She therefore joined the IPEB project expecting to acquire knowledge to this effect. Once armed with this knowledge she would go back to tell her students and show them how to use projects.

The general perception of the relationship between the teacher and the pupils, tended to be a traditional one where teachers are in charge, and they manage students as well as the students activities. In activities which required interaction with pupils, the teachers concentrated on being in charge and managing the learning situations. For instance, Malekhooa described her experience of the one day on which she was in charge of the camp activities as follows,

> I think, being sort of in charge, I was conscious of time and making sure that everything goes smoothly, my focus was not so much on the science that was going on, but the activity rate and time...so I was thankful that we had managed to do this and I was really pleased that it had gone smoothly,

and that we had achieved two of the aims we had talked about the previous night.

The teachers also tended to adhere to a set structure, they found it difficult to let go of the structure and allow children or the activity to determine a new direction. For example Malekhooa said in reflection that,

> I had a structure that I thought we were going to follow because that is what I am used to, being prepared and knowing where my pupils are going...and I'd say the one thing I battled with was that I wanted to structure, like I would at school.

The other difficulty they experienced related to their perception of knowledge as something one possesses prior to a teaching and learning situation. They were used to being prepared and having knowledge prior to activities in the classroom. They believed that with the prior knowledge, they teach better. They therefore wanted to be given this prior knowledge before they could interact with students. However, the possession of prior knowledge did not necessarily assist them in adopting a different role. Instead, it reinforced the tendency to direct students towards pre-determined goals. Furthermore, the knowledge is something possessed by teachers and the possession of knowledge is one of the criteria used to differentiate between teachers and pupils. In many cases the teachers were not aware of the role played by their insistence on possessing knowledge in reinforcing traditional teaching practices. Neither did they see the problematic nature of the power issues related to an objective conception of knowledge. They insisted that they felt lost if they didn't know what was coming, and the example from Malikhang indicates this,

> I don't like finding myself not knowing what to do, not knowing what to follow, I find myself being lost.

In an attempt to explain the tendencies identified above, Morena, an in-service officer and a participant in the research team had this to say,

> we people who have been a part of a South African education system which has sort of moulded us in certain ways, and traditionally we used to get instructions, we used to know precisely what must happen

From the point of view of teacher training, Thuso said in an interview, that,

> the teachers have been exposed to a more traditional mode of learning and teaching, where they have gotten used to being the authority figure and where they have got the syllabus and have to use that, they can't use their own ideas in implementing whatever work they want to do, maybe they have gotten so used to that mode that when somebody like you comes and expects them to go out and work on their own, set their own programmes and decide on their own what is important, they find it difficult to do that.

The gist of the two explanations is that the teachers that we had, are a sample of people who have been socialised into certain ways of thinking and acting, often traditional and positivist ones. Their training further entrenched these tendencies, while their working situations limited any initiative to break away from this traditional and well established view of teaching and learning.

The camp was an environment where adults and children found themselves creating knowledge together and discovering new things about science concepts together. The situation was uncomfortable for many of the teachers, especially the primary teachers. They felt uncomfortable with situations that forced them to discover new things alongside students. They believed that if teachers have to learn something new, their learning should happen in the absence of students. Teachers should not discover new things alongside students. The teachers were not prepared for the different paradigm. There were very strong feelings on this issue, and the example from Refiloe indicates some of the feelings of those teachers who were uncomfortable with the idea of teachers learning in the presence of children,

> we will be told, this is the project we are going to do, in front of students...then its hard for us coping with the project, we have to struggle side by side with students.

The feeling also relates to power issues, between teachers and students and also between teachers and the organisers. There is an implicit concern that the organisers were not giving the teachers due recognition as adults and that the organisers and the camp facilitators were not being sensitive to their need to be told things before children learn about them. There were strong feelings to the effect that the relationship between teachers and organisers/facilitators was not as democratic as it could be. For instance, at some stage teachers felt that things were being imposed on them. Refiloe's comment to this effect was,

> I think from Saturday to Sunday there was some kind of imposement, it was just imposing on people. The tension eased on Monday when there was interaction between us being facilitators...at first we were not designing the project as a group.

The feeling was reiterated by Lineo who pointed out that,

> you didn't know what to do as well as the children, so it gave me the feeling that someone is watching me while I am being confused...I as a teacher I don't know what is going on...the mere fact that you don't know who you are, what position do you have in a place causes a lot of confusion.

The teachers had come to the camp with some of their students, and having to learn along with their pupils was difficult. To their pupils they are respected authorities in their subject areas and the teachers did not want to jeopardise this authority position by exposing their shortcomings to the pupils. The above comment also highlights the extend to which teachers have come to accept themselves as knowledgeable authorities as a result of the socialisation referred to by Morena and Thuso. The knowledge ensures their power

position and situations that challenge this relationship between knowledge and power are perceived as challenging the status of the teacher. Lineo for instance felt that as teachers, they deserved to know exactly what their position is in a given situation and who they are with respect to the students.

An alternative role to the traditional one that is advocated by practical and critical views and which was encouraged in the IPEB project, is that of the teacher as a facilitator. The teachers' conception of the facilitator role was, however, not very different from the traditional one. In the classroom, and other classroom like situations where teachers interact with children, the facilitator role was perceived in a manner similar to the traditional teacher role. The facilitator was perceived as a manager of student activities who has expertise that the students should aspire for. The teacher/facilitator is perceived as a person who is there to help students learn what the facilitator already knows, she is not there to learn but to facilitate students' learning. When the situation doesn't fit the conceived definition of facilitator, then the concept didn't apply, and this is indicated by the following example from Lineo,

> at school I understand what a facilitator means, but while here (at the camp) I lost the meaning of what a facilitator is...I don't understand facilitator meaning someone who is confused.

There were a few teachers for whom the facilitator role was perceived as different and better than the teacher role. These teachers felt that the two roles are different although they lacked clarity about the ways in which the two roles are different. They felt that one cannot assume the two roles at the same time, and that the two roles cannot be mixed. However, in both perceptions of the facilitator role, either as similar to the traditional teacher role, or as distinct and different, the common feature was that this role is externally defined and the teacher needs to be told which one to assume and how to behave in each role.

4.6.2 Teachers perceptions of their role in research

In a workshop held earlier on in the project, the teachers had been asked to discuss in groups two questions that are related but emphasised different things. One question was on the role which teachers saw themselves playing in research, and the second question was phrased in terms of the contribution that they saw themselves making in research. The question about the role of the teacher relates to the degree to which teachers saw themselves as active participants, or even engaged in their own independent research efforts. The question about contribution on the other hand emphasised the teacher as a second party to someone else's design. The responses indicated that it was easier for the teachers to be specific about their role when defined in terms of contribution. Then they could see themselves involved in research, investigating policies, investigating communication systems in schools and conducting research on new teaching methods. Furthermore, the teachers would provide their classrooms as venues for research, they would allow others access into their classrooms, and support the process through participation. In addition, they would gather information from the classroom and then pass it on to others to be analysed and compiled. The processed information was then expected to come back to the teacher in the form of materials or recommendations to be applied or implemented. Thus teachers saw their role as the application and implementation of research outcomes.

The teachers felt that they possessed neither the knowledge nor the skills to conduct research and that research is an activity done by highly educated people in universities. Even for those teachers who felt that the outside researcher may not know enough about the classroom situation to provide expertise on how things should happen in the classroom, the accepted role of the teacher in improving the classroom is to provide the classroom as a venue for research. The outsider would conduct the research and the teacher would implement the findings of the research. The teachers also lacked confidence in themselves and in their capacities to do research. In the following clip from a video

recorded interview with Malekhooa, she captures the essence of the teachers' insecurities and lack of confidence,

> we think of ourselves as the workers and people who work at universities are at a higher level and we somehow have to get up to them (before we can be able to do research).

4.6.3 The teachers reaction to situations demanding changed roles

Given the way the teachers perceived their roles in the processes of learning and teaching, a researcher role would require them to change their roles and adopt a different approach to teaching and learning. The camp presented a number of situations where teachers were confronted with the need to change their roles and to change the established patterns of interaction with the pupils. Information from the reflective sessions shows that the change proved difficult for many of them, although many teachers found it helpful. Firstly, as noted earlier, the teachers were used to the traditional approach to teaching and battled with assuming a different role. Mantoa, gives examples of how she battled to interact differently with the pupils, especially those from her own class. The following is an extract from a video record of an interview I conducted with her,

> I have tried to change from my classroom role, but I was battling. I had to hold myself from giving a lot of instructions and directing pupils...I tried not to be with them all the time, but just to sometimes watch or pose questions.

In another interview, with Malekhooa, she indicates that for her, the difficulty was with breaking away from her perceptions of learning as a structured activity, where the structure is set and maintained by the teacher,

> I say the one thing I battled with was that I wanted to structure like I would at school, so I learned to let go of my structure and just do what the sun lets us do for a while.

Another challenge for the teachers was to let go of their power over students and the students' activities. The teachers were used to being in charge of students and controlling them. They placed a lot of emphasis on the managerial role of student activities. As the students confidence with the science activities increased and they seemed to manage on their own, the teachers became unsure of what to do, and felt they had nothing to do. They tended to withdraw from the camp activities and some sat outside in the sun. They insisted that they were confused because they did not know before hand what was coming and so did not know how to interact with the children. They were uncomfortable with a situation where they did not have opportunities to pre-determine the direction of the learning experience, and hence pre-determine the role they would have to play. The response to this dilemma was to introduce a rota of adult teams that would facilitate the days activities, so that the teachers could have a sense of what to expect. But this did not necessarily persuade them to change to facilitatory roles. Those teachers who were not directly responsible tended to withdraw. The tendency to drive students towards pre-determined goals, rather than following the direction of activities, still persisted.

In general the teachers struggled to change from their normal patterns of interaction with pupils and their usual approaches to teaching and learning. They wanted a fixed, specific role, the role they are used to, and this role had to fit in all situations that involve students learning. If they were uncertain about their role in a new and different set up, they became alienated from the activities and uncomfortable. They wanted to maintain their status as authority figures rather than have it changed.

4.7 Experiences and challenges of research processes

4.7.1 Identifying research questions

From the introduction to research that was done as part of initiating participants into research, the common understanding developed was that the research efforts should be geared towards improving the classroom and what happens in it. The topics identified by teachers therefore related to the classroom, and they could be grouped into four types:

1. Language use in science classrooms
2. Gender issues in science lessons
3. Children's pre-conceptions of science
4. Rural/urban differences in the science syllabuses

A number of issues emerged from the processes the teachers went through as they tried to engage in research activities. In all cases, the teachers thought in terms of doing research that identifies a problem, seen as located in pupils, and finding solutions for this problem. Their research focus placed more emphasis on children's' learning and almost no mention was made of investigating the teacher's role in learning. There was a tendency to look outside for problems, to look at other people as sources of problems, rather than considering all people involved in a learning situation as potential sources of difficulties. The following description by Mantoa of her research highlights this feature,

> we are going to involve children so we will be finding different ideas that children have and try and work out and see what we can do...I'd like to see the problems that children have in science as a subject and the way they see science and the motivation they have in their homes about science and the problems they encounter and what can be done to address those problems.

The description also indicates another feature that was common to all the teachers. Their general research focus was broad and they struggled to reduce the identified research

areas to manageable research questions. Mantoa's description of what is supposed to be one research topic, is in fact a collection of interests that could form research questions of their own. She intended to determine the ideas that children bring to science classrooms before instruction, and wanted to explore different ways in which these ideas can be used. She also wanted to identify problems that children have with science as a subject, she wanted to determine factors that motivate children from their home backgrounds and also wanted to identify problems that children encounter as a result of the backgrounds they come from. In effect she was looking at a number of topics which are themselves very broad. Without a clear idea of what really concerns her most in her classroom, and what she would really like to change, it became very difficult to move from this broad level of thinking. This problem was not unique to Mantoa, or even people who had no prior experience with research only. Even those with some research experience struggled with identifying a specific aspect of their classroom to put under study. Generally, once the teachers had identified a research area, it was like they reached a 'cul de sac', they had no sense of the direction to follow from there. For example Sello, said in an interview that,

> now I am at a cross-roads, I am not sure where to go with the topic I have chosen.

Part of the problem of selecting one aspect out of the many aspects of the topic was that for teachers the different aspects of their research areas were closely related issues, which in some cases were of equal concern. The teachers also experienced difficulties with deciding on which aspect of the topic to probe more deeply, and the following expression from an interview with Sello, is an example of this indecision,

> I am now seeing a whole range of other aspects at play, I am trying to get a feel of what to look for...how does one determine which one from the other related questions.

Another difficulty was that the topics chosen and the questions identified within these topics were not consistent, the focus kept changing. For instance, in the case of Sello who wanted to research language, the topic started off as the language in textbooks and how it

creates problems for science students. This later changed to language used in the classroom. The description he gave of what he was trying to do highlights his dilemma,

> we are trying to look at the nature of language that is appropriate and how one can sequence the sentences used so that they help students in their learning...I think one has to look at texts, how it relates to the concept (e.g. pressure), do they insulate it as a concept of science, not as a concept of science which occurs in their world, what language is used to communicate that knowledge, is it the same language used with family and friends, the difference between classroom language and outside language used with family members...now to say what am I looking at, is it their (students) ideas or the vehicle they use to express these ideas.

Thus for Sello, the topic kept changing between the nature of the language, whether it is the classroom language or the home language, how the ideas of science are communicated and the factors which influence this, how the teacher can communicate scientific ideas, for instance by sequencing, and also how language is used in textbooks to communicate the scientific concepts. As a result of this, it became difficult for him to get started because he was not decided about what it was that he really wanted to investigate. For Sello, the several discussions we had with him, on his research and attempts to clarify his research focus, helped him to get started with the question of the role that the home language and background plays in the ways students formulate their understanding of scientific concepts. Other teachers experienced this difficulty for a longer time, for reasons including that some were less motivated than Sello. Some could not make a clear link between their research and their classroom practice, while others were not able to receive sufficient facilitation due to a number of constraints discussed later in this chapter.

Although it emerged from the introductory workshop which focused on research that many teachers were aware of a number of techniques used in research, most were not familiar with their usage. They were unsure of the research tools that would be appropriate for their research. In one case where the teacher had made decisions about the

methods to use, he did not posses the skills for using the techniques. This is one of the teachers who received a lot of support from me. At first, the expectation was that I would design the research tools. I did not do this, and instead, we agreed to collaborate. In the end what happened was that I designed a questionnaire and the teacher concerned just endorsed it. Sometimes the teachers did not have resources such as tape recorders, and when they were provided, they did not have enough time to listen to the tapes they had made and to transcribe them. In some situations I also listened to the tapes with an agreement that they would listen to the tapes and we could then sit down and discuss the data from the tapes, but again, the reality became that teachers expected to hear what I had to say about their tapes and they would take my word and work on the basis of what I said. As I discovered the expectations and dependency inherent in it, I brought the issue up with the teachers and they made more efforts to trust their own abilities and judgements. For instance, Sello was then able to draft a rationale document that we had discussed in the language group and identified as necessary to clarify our research and the choice of direction of the language research projects.

4.7.2 Assuming a researcher role

The teachers were very conscious of the researcher role as being unfamiliar. They did not perceive themselves as researchers, partly because of the perceptions of research they had as a formal activity. For instance a transcript of one of the reflective sessions held at the camp shows Sello indicating that he was very unsure of what he was doing and uncertain of the extent to which his activities qualified as research. This is how he put it,

> I am not sure whether I am doing the expected thing...perhaps it comes from the fact that I know that I am not a researcher and I am trying to play a role of being a researcher, and I feel that I am not doing enough.

The result was that expectations to carry out research activities created anxieties and insecurities with teachers feeling unsure of whether they were doing the right things for

the researcher role. They lacked confidence, and doubted their capacities to become researchers. In a video record of an interview I conducted with Malekhooa and Lineo, Malekhooa described her feelings as follows,

> I have always felt that I am not good enough, I don't know enough to do research...teachers don't think very highly of themselves, when asked what we do, we tend to say, I am just a teacher,

and in another interview, Mantoa said,

> I had heard about research, but I thought it was for those exceptional cases, the highly educated and I thought I would not be able to do it.

Another factor that contributed to the anxieties was a perception of the techniques of research as special and associated more with academic and more traditional types of research. The more practical practices that teachers are familiar with, were not thought of or recognised as research, and the teachers said it didn't feel like research. As Malekhooa put it, teachers have a highly theoretical perception of research and find it difficult to recognise things that teachers ordinarily do in their classrooms as techniques that can be used in research. She said,

> when I first heard of research I thought research is what I want to do, but I didn't know how to do it, I thought I had no idea of how to do it, I thought I had no idea of what it meant to do research...but the kind of activities that they (students) did, show you what kind of questions to ask, and when asking those questions, you suddenly realise that I am doing research,

Mantoa described her lack of confidence and how the group atmosphere helped her,

> I wasn't sure whether I know how to do research, but through group discussions I discovered that I wasn't aware that I can do research, I wasn't aware that that was the right way of doing research.

Another area of difficulty was the transition from thinking about doing research to actually doing it. This was not spontaneous and proved difficult for all, including the teachers who

had done research before. The teachers found this frustrating as they felt that they had no clear sense of direction. They also felt that because they lacked experience in a similar situation, they had no frame of reference to base themselves on. The lack of experience created frustrations, because teachers felt that as a researcher, there is a certain way of acting and that the organisers were expecting them to act in this way. But they did not know how to match these perceived expectations. The following questions posed to me in an interview with one of the teachers highlights this dilemma, "how do you do something you have not done before". Those who managed to do some research, constantly needed to be reassured that they were moving in the right direction.

This dilemma was experienced by the facilitators as well, as they were also facilitating an evolving process and they also had no prior experience to refer to. In a reflective session between myself, Lerato and Morena, we recognised the complexity of a situation where teachers have no experience with research, and yet are supposed to learn to become researchers by engaging in research activities. It was a different way of learning form the usual prior training followed by practice. The following comment from the main facilitator, Lerato, highlights the dilemma for facilitation,

> how do you deal with that very difficult period where people are uncertain about what you are talking about and yet you are trying to involve them, something that they have never been a party to?

Being new in research, especially qualitative research, the teachers felt they did not know what to do, even those who had previously done research for academic courses. In some cases, even the very basic processes like recording events and reporting on what one has been doing were unfamiliar and made teachers uneasy. The following is an extract from a video in which Mantoa describes how she felt in a meeting where she was asked to describe to new members what had been happening in the project and to trace developments up to that stage,

> I did not know that I can be able to give a report back, so I experienced frustrations in group discussions when we had to report on our activities...

> I was supposed to say what has been happening and what we had learned, and I was not sure that I knew what had been happening...I thought my gosh, do I know what I learned, can I trace the things I have learned?

We discussed the need for each one of us to keep records of our activities and our feelings, and the changes we were experiencing at different stages in the project. Most people did not do this until at a much later stage in the project, even then it was only a few people who consistently and systematically recorded the things they were doing and the lessons that were emerging from their experiences in the project. The data shows that for some people, the very idea of recording things was foreign, and that is why it took them so long to keep written records of their experiences. In a discussion with Tsepang, at a much later stage in the project, she pointed out that for her, the whole idea was new, she said,

> I did not know that it is important to write things down, I used to see Kuena writing things down, so I said, oh, its important to write things down, and then I started writing things, sometimes if I didn't have a piece of paper, I would even jot things down on a tissue and transfer them later.

On the whole the teachers, including some who had previously done research for academic purposes, had little confidence in their abilities to carry out the research and needed someone to frequently encourage and reassure them.

Most of the teachers, especially those who were part of the project from the start, felt that changing to a researcher role required changes in the way teachers perceive things and the way they do things. They felt that in a process of research, one has to learn to be observant in all situations and at all times. They also had to learn to be analytical of situations and events and not just take things at face value. This was unfamiliar, difficult and in some cases frustrating. Mantoa describes a situation where she felt she had to behave and think differently,

> in meetings when asked to give feedback to other people, those who were new in the process, it was frustrating because, I had to compile all these things stage by stage, also say what I have learned or seen, I was not sure whether something had been happening...while I am seeing something, I have to have questions in my mind about the observation I am making, and that was not easy, it was frustrating.

There were many others like Mantoa who felt that research requires critical thinking and requires that teachers be able to make critical observations as well as justify any claims they made relating to these observations. They felt that one needed to be constantly on guard and ready and justify observations and conclusions drawn.

One of the difficulties experienced by teachers, as indicated earlier, is that they found it difficult to focus on one specific issue and illuminate this as an area to be studied. The teachers felt that to be able to do this, they needed to be able to stand back and reflect on their practice, isolate specific aspects of their teaching or lessons, and think about them and even acknowledge that they might have been wrong about some things. However, the problem as Thuso pointed out is that,

> teachers teach the same topic across different levels over many years and what they teach becomes normal, it is difficult to stand back and identify a single aspect of their work for studying...over time the way they teach becomes normal and the way to do things, it is difficult to identify problems in their work without an outsider pointing the problems out.

One of the qualities identified by the teachers for individuals to be able to successfully change to the researcher role is that they needed to be flexible. In addition, the teacher as a researcher approach, requires that teachers become flexible about the roles they play in teaching and learning situations, and generally in situations of knowledge generation. The problem is that, as Thuso put it, "teachers are used to being the authority figure in the school and the classroom". Furthermore, she pointed out that, a process that requires

change from this authority position and is seen to threaten that status could be rejected, or even lead to withdrawal from the process. This withdrawal from activities was witnessed at the camp when teachers became inactive and deliberately passive because they felt that when students did not need their assistance, it meant that part of the plan by the organisers was that this would happen at some stage, but the teachers had not been told what role to play then, a role that would not challenge their authority status. Teachers were also uncomfortable with situations where the content knowledge proved to be lacking for some of the science activities at the camp, and this realisation happened in the presence of students. The facilitators had to acknowledge that as the process evolved and new challenges emerged, there was a need to built into the project mechanisms for addressing the feelings that individuals had and for preventing the alienation and frustrations created by such situations.

There were a few teachers who recognised that a research process requires that they be prepared to be self-critical and not only acknowledge problems but also talk about them with other people. This was not easy, and in fact it was much easier for problems to be interpreted as personal issues and to be addressed at that level. In the interview conducted with her, Thuso said that she had experienced similar problems in her workshops with teachers in her capacity as a subject advisor. As she put it,

> teachers don't talk about their difficulties or acknowledge things they do not know...they will not say that they do not know how to do research, because they are supposed to be experts.

Due to these problems, and others that may not have emerged in this study, it appears that the teachers found it difficult to meet the demands of a researcher role. Other participants felt that another contributory factor is the type of pre-service training that these teachers have been exposed to. They described it as a very traditional mode which does not cater for the abilities and skills that a researcher role demands from teachers. Another factor is the environment and the ethos of the situations in which teachers work. It is a situation

where almost everything is pre-determined for them, and there is little motivation for teachers to be creative and critical of their practices. Thuso pointed out that,

> they are used to getting a set programme (syllabus) to work through, so they do not have to think hard about what to do, they have been trained to teach in specific ways, so they do not have to think about how to do things, and they are allocated a specific time, so they do not have plan how to use their time at school.

4.8 Barriers encountered

The project and the research efforts of the teachers were constrained by a number of factors, some personal and some emerging from the context in which the teacher research efforts were occurring and some resulting from the general organisation of the project. The problems and difficulties discussed are those that were felt most by the teachers. In some instances the facilitators experienced the same problems, but from a different angle and these are discussed as well. There were problems cited which also emerge from the contexts in which teachers work.

4.8.1 Time

The teachers felt that time is one of the major constraints for those who wish to adopt a research stance. They felt that they had to budget time as there were other activities competing with the research for the teacher's time. These included teaching responsibilities, extra-curricular activities supervised by the teacher at school and other personal commitments such as studies and family demands. The teachers had to make decisions about which activities were more important in the time that they have. The teachers felt that in order to do research they had to sacrifice some of these other demands on their time. The perception was also that research is an extra activity, additional to the normal teaching duties. So doing research in the classroom would mean that the teacher has to either sacrifice some classroom activities or be willing to stay extra time at school in order to accommodate research activities. Many teachers were not able to do research for this reason, because they claimed they could not find time to do research and at the same time meet the other demands from their school, especially the duties that they get paid for.

Another problem was that the research project required them to attend meetings and workshops, and these could only be held in the afternoons, after teachers were through with their normal school activities. This is also the time when schools could release them from other duties. The afternoon time was, however, inadequate and inconvenient because

it is the time when teachers are also in a hurry to get home, after a long day at school. In some cases, meetings had to be stopped prematurely because of the time factor.

Another problem with time, especially for the teachers who came from rural areas is that their contact with facilitators had to fit into the school time, but often the facilitators could not reach the schools in time to find teachers still at school. The bigger problem here is the fact that the facilitators were doing this on a voluntary basis, and that there were no full time people who had the responsibility to reach teachers and provide facilitation and support. All the people who were part of the project were volunteers combining the research with their other duties from the institutions in which they were based.

Time was not a problem for the teachers alone. It was a problem in the project as a whole. Firstly, non-profit making projects are ultimately accountable to their funders, and the life-span of a project depends on the amount of funding available. This creates a time problem as there are certain activities that have to occur, and this may take place before participants are ready to engage with activities at a particular level. For instance, one of the major events in the project was the science camp. The science camp was set for a specific time which could not be changed. The intention of the organisers was that teachers should be engaged in some research related activities prior to the camp, so that the camp would provide an atmosphere for them to intensify their research efforts. But this created problems, for both teachers and facilitators. The short time in which people had to try to understand the concept of research, and try to adapt into a researcher role led to some people feeling pressured to move on before they were ready. Morena described the feeling as a situation where

> people felt pressured to move even before most of us had found their feet, before they even found their place within the group.

The time limitations also meant that the group did not get enough time to develop as a group, before they started engaging in activities together. Developing as a group encompasses processes such as knowing each other, building rapport and trust in each

other, and feeling secure enough to raise issues and criticisms of each other without hurting peoples' feelings or exposing one's own shortcomings. On later reflection between myself, Morena and Lerato, this shortcomings were acknowledged and Lerato pointed out that,

> I think that I expected people to get on board too quickly and start doing something...but there has been a realisation that things will take a lot longer than I originally expected and we need to find ways to deal with that in a supportive manner.

Although this issue led to a realisation that perhaps facilitation was not being responsive enough to the needs and issues emerging from the teachers, Lerato felt constrained in that there were certain things she could not change about the project, such as the scheduling of the science camp. Its time and duration were fixed. She pointed out however that perhaps, the participants as a whole could explore ways in which more support structures and mechanisms could be provided for people who needed support.

The facilitators, faced a similar problem to that of the teachers, the problem of the project competing with other responsibilities for the facilitators' time. For example, Morena's responsibilities at work required him to travel a lot and there was not enough time for him to meet with Mantoa and discuss their project and actually get started. As a result their project did not really take off. The lack of time also meant that facilitators could not detect in time and respond to emerging issues by way of re-directing or re-focusing the research process according to the needs of the teachers. Morena for instance, did not have to time to realise the extent to which Mantoa was dependent on him and that she was waiting for him to initiate their research processes. At the camp, where Mantoa was receiving support from other people, she changed her research focus and in fact started her research on gender issues without waiting for anybody to tell her what to do and how to do it. She said later that she realised she could do it on her own and that she did not have to be depended on others, she asked herself what would happen if the other person never shows

up. This spurred her onto research in a different area which she felt was more interesting to her.

4.8.2 Support

The teachers felt that the support they received was inadequate. This was described in terms of how their expectations for help with carrying out their research efforts were handled, support in terms of material things and the location of the centre of support. The approach adopted by the project organisers and the facilitators was that facilitation will adopt a process mode, where teachers are guided to carry out their own activities without facilitators telling them what to do, but rather addressing their needs as they emerged. The teachers would be guided towards a direction determined by them. It was also an approach that gave teachers ideas to try, rather than prescribing strategies that work. The teachers were expected to exercise their own judgement in making decisions about what works and what does not work for their contexts. This was an unfamiliar approach to the teachers, and some felt therefore that their needs were inadequately addressed. The teachers expected the organisers and facilitators to be experts and to behave as such. There was, therefore, a mismatch between the assumptions of the teachers and those of the organisers/facilitators. In an interview with him, Sello described the dilemma in the following manner,

> in the project, no one is assuming an expert role, so when a teacher wants a specific answer to a problem, there is no one person who can give a definite answer or a solution to the problem.

Some teachers found this approach challenging, while others interpreted it as a sign of lack of organisation and an inadequate form of support. The following statement obtained from a transcript of a reflective session indicates this,

> the support is inadequate, there are not enough people to exchange ideas with and seek direction from. When I go to a facilitator to ask for a solution she will only provide suggestions or refer me to another person

and this person still doesn't give me an answer and I am back to square one, I still have to find the solution myself.

Another issue of support related to monetary and other means of material support. Most teachers expected monetary gains from the project and were disgruntled when the money was not forthcoming. An explanation offered by Sello for this was that some teachers were used to workshops where they were paid in order to stay in the workshop and so they expected the same from this project.

A third problem relating to support was the fact that the centre of support was the IPEB offices, outside the school. This was far from the teachers and meant that teachers had to go out of the school to seek help instead of support going to them. Communication was also mainly through the IPEB offices and teachers felt that it had been inadequate.

The provision of support was difficult for the facilitators as well. In a project where the approach adopted was one of collaboration between teachers and facilitators and where there were deliberate efforts to operate in a framework that challenges inequalities between the teacher participants and the initiators of the project, the facilitators were also faced with problems regarding the approach to support that would be appropriate. In theory, action research or teacher research, is supposed to be a personal process and the outsider's involvement should be at the invitation of the teachers. In a project where the outsider is the one who is actually initiating the process, the facilitator faces a dilemma in deciding on her role. The facilitators expected that because the individual research projects belonged to the teachers, it was the teachers who were to give them direction about the type and form of support that was appropriate. For in stance, Lerato found that she had to play a number of roles at the same time and expressed a need for somebody to clarify the exact role that she is supposed to play. The teachers on the other hand expected direction from the facilitators.

Another source of dilemma for facilitation related to finding forms of support that discourage the inequalities between different participants. This had to be done in a context where some participants were not challenging the inequalities and instead held expectations and acted in ways which reinforced them.

The other difficulty for facilitation related to teachers' expectations to gain knowledge. This differed from the organisers' expectations of the outcomes of the project and constituted a clash of interests. The facilitators could therefore, not provide that type of knowledge as their interest was to expose teachers to a different approach to training. An approach that emphasises critical and self-reflective approaches to learning and teaching, rather than concentrating on increasing content knowledge. The organisers wanted to make a deliberate move away from a tradition that they recognised as problematic for teachers' professional development. The following question posed by Lerato in one of the reflection sessions highlights this dilemma,

> how do you deal with that as an issue in a workshop, where you know you can't deliver to that expectation?

Another problem emerged from the fact that the majority of teachers in the research team did not have any experience with research. In order to help them, facilitators needed to find out what their needs were with respect to doing research, and exactly what role the facilitators could play, in helping them, without resorting to the traditional telling methods. The problem with this attempt to offer facilitation informed by a bottom-up rather than top-down approach was, as Lerato indicated,

> how do people know what they do not know, how do you know that you need something you have never seen before, you don't know it exists?

4.8.3 School organisation and environment

Most teachers felt that the school and the way life is organised in schools is one of the main constraints to teacher research. Firstly, at school, teachers do not have control over

their time and how they use this time. Decisions about how long a lesson lasts and how long a teacher has to be at school or outside school are made largely by the principal and in some cases, heads of departments. For instance, as Lineo pointed out in an interview with her, a lesson period in the school may be only 35 minutes long, and

> when your time with a class is finished, you have to stop and go to another class so that disrupts the activities and makes continuity difficult.

The teachers pointed out that at school the teacher does not have control over her programme of work, so it becomes difficult to attend meetings and to fit research into the time slots allocated to him/her. This is further aggravated by the power structures in schools and the fact that for the teacher to be away from school for any purpose, professional or otherwise, s/he needs permission from the principal. One teacher who changed schools missed several meetings because the principal of his new school would not give him permission to leave school a little early to attend. In fact the principal wanted to send a different person who had no idea what the project was all about. One of the teachers who later became a subject advisor said that in her new position she felt more liberated and found her working environment more conducive for research because now she can draw her own programme, she can decide where to go, on what day and who to see at any point in time. The teacher on the other hand does not possess this freedom. The teacher's participation in the research depends on the support or collaboration of the authorities at school.

The teachers further pointed out that the inquiry approach and experimental orientation of teacher research is especially difficult in African schools where the history of segregated schooling and unequal supply of learning and teaching resources has resulted in almost non-existent educational materials. They felt that even if a teacher gives pupils a chance to do things on their own so s/he can observe them, the lack of resources becomes a constraint. An additional factor is the large class sizes, with up to 80 students in one class, which makes it difficult to make students work in groups. It becomes difficult for the teacher to observe students one by one and note each and every thing that they are doing.

In two cases, there were disruptions in the schools where the teachers worked due to student unrest. One of the teachers ultimately felt left out of the project activities and discontinued her participation. The other teacher was involved in structures which were trying to resolve the issues around the unrest. On several occasions he could not attend meetings and could not keep appointments that we made for interviews and discussions of his research topic. He is one of those who never managed to take off with a research project.

4.8.4 Incentives and Rewards

There was a general perception of research as an extra duty, and an additional activity to the job that the teachers get paid for. For most teachers, it was not clear what relevance research has for their work in the classroom. The perception that research is an optional extra and irrelevant, coupled with the other factors already mentioned, led to expectations and subtle calls for payment. The teachers felt that they needed an incentive to do research, they needed to see the benefits of research in tangible forms, something that was going to help them in a particular way. Although they recognised research as a learning process, this was not enough of an incentive and was considered as secondary to material benefits. The question of rewards and material benefits from the research was strong and recurrent throughout the whole period of the research project as seen in statements made by different people in reflective sessions as well as individual interviews conducted. These are some of the statements relating to the need for material benefits;

Thuso said,

> knowing that the research will improve their teaching may not be enough motivation...people want to be pressurised to perform when there is a reward...what is it in this research really that gives them a push to be active, when doing a research for a university course, knowing that I will get a mark at the end of the day provided the push for me, what incentive is the project providing for teachers?

Sello felt that,

> an acknowledgement is not enough motivation, while others are getting degrees...the reward has to be tangible, but it is very difficult to be in research and see something tangible in it

while Mantoa pointed out that,

> some people expected immediate short term rewards, rather than the less obvious long term rewards, like learning...that is why some people left, because people were saying, what are we getting out of this, others are getting degrees, what about us, we are just going to be used, but I said, let me just do it and maybe I will learn something out of it.

4.9 Changes undergone by the teachers

Although the teachers did not necessarily become full fledged researchers and did not actually engage much in classroom research, the project and their attempts to do research provided them with a number of learning opportunities. They learned about themselves as teachers, about learning and how it happens and how they can change the way they interact with pupils in order to improve their facilitation of the children's learning. Their perceptions of research, how it is done and the role of teachers in research also shifted. They also became aware of some of the ways in which their own perceptions of themselves were hindering their attempts to become researchers. The following statements taken from transcripts of reflective sessions and some from the video taped interviews, are some of the reflections from the teachers:

Malekhooa became conscious of how her usual classroom tendencies were getting in the way of her change to a facilitatory role. In this example, she shows how she had to change the role she was playing in order to better facilitate learning:

> I'd say the one thing I battled with was that I wanted to structure, like I would at school...so I learned a lot from that, to let go of my structure and just do what the sun lets us do for a while.

Lineo learned how to trust the children to make judgements about what they want and some of the ways in which group work can be made successful:

> the other part that I found interesting was that of presentation, we were unsure about it...but I liked its after effects...and you would hear one kid saying to another, okay, don't write like this, when we present we want our group to present a very good presentation, so write fast...and I think that worked, and they enjoyed it. If other teams could sometimes later try it, it works, it encourages them.

Malekhooa also learned the value of trusting students and giving them a chance to make decisions for themselves and how building confidence in children can help them engage actively in learning situations,

> I was worried that I had pushed them to do something that they would not be able to do, that little girl got up and spoke so nicely and what she spoke had been talked about in the group...it was difficult for her to do that but she did it even though it was so hard for her...It's a little confidence of group work and to do good group work you need confidence, so perhaps it was the building of confidence more than anything.

Sello found that the camp experience challenged some of the ways in which he had been interacting with his pupils and that he needed to accommodate learners as individuals and look out for the differences between them in order to address the specific needs of all his students. On reflection of how the camp experience relates to his practice in the classroom and how he learned to facilitate learning for all students, not just the more forthcoming ones he said,

> I believe it will affect my practice in the sense of giving me a lot of empowerment, and not just looking at what goes on in the classroom but going beyond understanding on the concept and also understanding that there will be always pupils who see things differently than the average pupil.

Sello also learned that communication between the teacher and his students is not just about what is said and how it is said. It is also about the teacher as an authority in class, and that it is especially important to be conscious of how the things said by the teacher are perceived by students,

> I think I have learned a lot in terms of providing clear instructions to the kids, not only on their side, I also learned a lot from using English instructions and also understanding how they grapple with the information as an instruction from the teacher.

For Tsepang the camp indicated just how important it is to be critical of what is happening in class, and that facilitating children's activities goes beyond just watching over them and directing them towards given ends. She became conscious of the need to be observant of exactly what the pupils are doing and, from that, determining the nature of her intervention in the activities. For example she notes that although she was always observing her pupils at school, she did not realise the importance of the things she was doing,

> when kids are doing activities, I have become curious and observant, its something I do in class, but I wasn't aware that its important.

Mantoa became conscious of the way she was interacting with pupils and realised that she needed to change the role she was playing. She pointed out also that the change of roles from traditional teacher to facilitator is not easy,

> sometimes you have to give pupils a chance to do things for themselves, because if you do something for yourself you feel great, I can do it, its not

> easy to forget what you have done yourself. We must give kids a chance to explore...I have tried but I was battling, I had to hold myself from giving a lot of instructions and directing pupils.

There were also shifts in the way teachers perceived research, how research is done and the role of teachers in research. For Malekhooa, the perception of research as a highly academic activity, done by people in universities changed. She also became aware of how her own self-image played a role in deterring her from doing research. She felt that the camp had increased her confidence in herself, and also showed her how the activities that teachers do in the classroom can be interesting and can be the starting point for research about change in the classroom. She said,

> my attitude towards research has changed, I have seen it as more practical than I thought it was...I have always felt that I am not good enough, I don't now enough to do research ... this camp has changed that, I have realised that you don't have to change all that much, you just have to think a little differently...this camp has taught me that things that we do can be very interesting and we don't need to have that high intellect, or the high intellectual plane that we think is stuck in the university, it shouldn't be there, it should be down here with us.

Mantoa felt that the way she perceived research and the role she can play in research had changed. She also felt that the camp and the team approach in the project had helped her change the way she considered herself and her capabilities. Her comment portrays how she also changed perceptions about the way research is done,

> I thought I wouldn't be able to do it...now I think I can do it, with the help of the others that we are working with ...I wasn't sure whether I know how to conduct a research, but through group discussions, I discovered that I wasn't aware that I can, I am able to do a research, its just that I wasn't aware that's the right way of conducting a research.

Mantoa is also one of those teachers who could not start their research projects during the pre-camp phase, partly because she waited for her co-researcher and facilitator Morena to come and initiate the research. While at the camp, in the absence of Morena, she decided to change her topic and got started with research activities on her own. In response to my question as to why she could do that at the camp and not earlier before the camp she shows how she discovered that research does not necessarily have to start with formal training provided by someone considered more knowledgeable. Furthermore, she discovered that it does not necessarily have to be a response to felt deficiencies, but that it can in fact originate from the teachers' curiosity about what is happening in a learning situation. Her own research started from curiosity,

> I got curious about children's activities, I started asking: why are they doing this, then I wrote the questions down, then thought maybe I have to ask them, so I went to ask...I have discovered that I can do it on my own.

Tsepang shifted from no idea about research at all, to research as a very practical activity, that even she can do it. Although she portrays an oversimplified view of research, her comment shows how her confidence has been boosted by the camp experience,

> when I was there (at the camp) it was clear to me that anything I was doing was research, even if I wake up in the morning and I think what am I going to do today, it was a research...so now I think I can do it.

Lineo also felt that for her the attempts to do research had changed her perceptions about how research is done and had provided her with skills for doing it,

> now I know what I want, I can plan what I am going to do, how I am going to do my research...I have gained some skills of how to do it, now I know I can make my own plans and decisions of when to observe, be active and how I will be active, who to approach to get what, now I know, but before I couldn't. The camp has helped me in that way, not like watching children, not thinking that I will learn something by just watching children,

and in reflection of how she has learned to interact differently with students she said,

> I have gained some skills, such as not supplying answers to kids rather giving them a new activity that will lead to an answer.

For Sello the entire project was a very different and more meaningful approach to his professional development. He compared the project and especially the science camp to INSET activities that he had previously been involved in and this is how he put it,

> I have attended a lot of INSET courses where a lot of work-shopping is done and teachers will go with a lot of paper work and then its the end of the story. But here, one was able to interact with the kids, not only from the content point of view, but we are also learning to see how kids understand the concepts which is very important for us to hone up our classroom practice...the INSET that one has been exposed to is nothing compared to what we have experienced here and witnessed, working with kids and understanding the content through the eyes of the kids.

4.10 Reflections on my experiences as a researcher, co-organiser and facilitator

4.10.1 My initiation to research and how it affected this study

My previous experience with research was almost non-existent, except for small scale research projects done as part of some of the post graduate courses I had done prior to this study. The main exposure to research had been theoretical, through reading and through discussion in class of some of the approaches to research, such as action research. It was from one such discussion that I developed an interest in action research and later on teacher research as an approach to improving teaching practice as well as the professional development of teachers. My personal view of professional development is that it should be based on the needs and concerns identified by the person who is undergoing the development. The statements provided here have been extracted from transcripts of reflective sessions, entries from my reflective diary, transcripts of discussions I had with Lerato and others that I had with Lerato and Morena.

Because of the mainly theoretical nature of my initiation to research I had several assumptions and expectations of a research process, some of which proved problematic in practice. This quotation from what I said in one of the reflective sessions indicates my thinking about research and how some of the ideas I had were challenged by the way the project and the teachers' activities were unfolding,

> I think being new in research, I had expectations that I am now finding problematic. For instance, its all exciting to think of being a researcher, doing research sounds like the thing, but when you get involved in it you find that it is not so easy, there are a whole lot of other things that you need to take into consideration. For example, I have done some reading about action research, but I am still left with this question, in practice, what things are we going to be doing for us to be able to argue that what we are doing is indeed action research. One would think that by reading I would gain a lot but I still ask why I call it action research.

I felt that I also had to resolve the issue of whether my research was on teachers engaged in teacher research or action research. The dilemma for me was that from the literature I had read, my role as a participant in teachers' action research projects was in conflict with the ideas behind action research. I felt uncomfortable because from what I had read, action research was supposed to be a personal process where my involvement would be by invitation, but in this project, I was one of the people who were actually inviting teachers and getting them to engage in research activities. My other concern relating to action research related to the type of change that teachers engaged in it can bring about. One of the issues I raised in a reflective session with Lerato was whether action research is,

> always meant to bring about social change and in the classroom context how does it bring about the social change, does it depend on the issues that are being researched and the action that is being taken...if teachers are doing research which we are calling action research, the change that comes about what kind of change is it?

I also found that research, especially qualitative research which employs participant observation as a research strategy, can be a complex process that requires skills which I did not possess. I found that I had expectations which became redundant in practice. In the same reflective session referred to above, I made the following observation about the way events were unfolding about my research,

> my expectations were that I would read, draft some questions, go out to classrooms to observe, tape lessons, videotape, interview and at the end of the year (the first year of the study), I would have a thesis done and well done. But things have turned out differently. I had a well written and typed plan that shows the actual dates, months and what would be happening on specific times and things are not working out like that.

Although I had an idea of the issues that I wanted to research, it was not easy to formulate a clear topic and from that derive specific research questions. Initially the research was to

be on teachers' attempts to engage in action research activities. This had to change with the realisation that the teachers may not be able to engage with research at that level, and that we (the facilitators, including myself) had to lower expectations to just teachers engaging in research activities and what can be learned from that.

I also experienced difficulties with deciding which tools to use during the time when I had not yet clarified my research objectives and the kind of information that I wanted. At some stage I was thinking of drawing up questionnaires and interview schedules, but I did not know what those questionnaires and interviews would be about, so I felt that I needed to go through the stage of clarifying my research topic first, before I could know the exact questions to ask and what form those questions should take.

My initial plans were that I would periodically sit down and reflect on my research, perhaps discuss it with other people. However, this did not happen in that manner, the reflection was not done according to a strict plan, it evolved as part of the entire process and could not be separated from the other activities in the project. For a large part of the pre-camp phase I had the subconscious feeling that I had not yet started with research, because I had not acted according to my plan. I had not yet gone to schools, which I considered the practical component of the research, as opposed to the theoretical aspect which involved reading and holding discussion with the other participants. I needed to redirect my focus and determine exactly what it was that I was studying. Once I passed through this stage, I realised just how much information the meetings, workshops and discussion were generating about teachers' values, perceptions, beliefs, assumptions and attitudes towards research: the very things that form the core of my research. I wanted to see teachers doing research, without taking time to first develop an understanding of how they get into the process and to develop an understanding of how the context in which they were to undertake research as well as their own personal views and beliefs affected the process. The realisation that my research was really about these behind-the-scenes issues, these underlying issues to the way teachers think and do things, came much later in the process.

Since much of my knowledge about research came from reading, I often battled to resolve the relationship between theory and practice in research. I was conscious of the approach I had adopted as advocating a relationship that does not have practice as an application of theory, but the two as mutually informing each other. Therefore, I found it difficult to make decisions about the role that literature should play in my research. The following extract from a transcript of a reflective session indicates my dilemma,

> sometimes I also ask myself whether I should read first or discuss my research with other people first. If I read first, is what I am reading not going to, am I not going to try to pick up things from there and drive everything else towards that, but at the same time, when I think of should I really be involved in the practical things first and then read afterwards, I feel like maybe if I had read first, I would have a better idea.

4.10.2 My experiences as a facilitator

Facilitating the teachers' activities exposed a number of assumptions that I had about teachers and which proved problematic. One assumption which was proved wrong was that since the teachers were eager to become researchers and were excited about the idea, they would easily translate this excitement into action. This excitement did not translate easily into action. One of the statements I made in a reflective session highlights this assumption,

> I had the belief and expectation that when people are interested in things, enthusiastic and excited about research, they would very easily be able to translate that into action.

I also thought that the excitement meant that teachers would be able to create time to do the research, but I learned that,

> You (myself) don't really know how busy a teachers life is until you try to get them involved in something that at the back of their mind, they think is something extra.

Facilitating the process also showed me that to successfully get teachers into a researcher role,

> one has to pass the stage where the teachers feel that the research is something extra...I didn't think there would have been a situation like that, I thought the meetings that we have had so far would have prepared people enough for them to see it as their research, not my research.

The intention of the organisers was that all participants would take part in the process because they had identified something in the process that is worthwhile for them. By implication, the participants would assume equal responsibility for all activities in the process and take part in activities as equals. My assumption was therefore that when people came to meetings, they came because they found it important and because they felt that meetings were meaningful to them. I did not expect to find situations where some participants came to meetings to be told things, and impatiently wanted facilitators to get on with the business of the meeting. To me the reflective sessions and meetings were voluntary and taking the step to attend implied that one finds something useful in them. I was therefore unprepared for people who attend the meetings for the sake of it.

I also experienced difficulties in the early stages, and especially, in the language group where I was perceived as both researcher on teacher research and co-researcher in the language projects. I found that in some instances, I could not balance the two roles. I had to sit down and formally write the roles I expected to play and what activities would characterise each role. Once I had clarified to myself what each role entails, I was able to monitor my interactions with the teachers. This statement, taken from a transcript of a reflective session describes my dilemma,

> Sometimes I find myself very absorbed in the actual preparation of the research that Sello should be doing and then forgetting that I should actually be looking at how he goes about the whole process of research...I find myself asking myself about my role, what am I, who am I, where am I going...the other thing is about the teachers that I have been working with, what is their perception about my role, what is their expectation of my role.

4.10.3 My experiences as a learning researcher

Although I had an idea of the issues that I wanted to research, it was not easy to formulate a clear topic and from that derive specific research questions. To actually develop a clear direction of the research and to design specific questions for the research took me a long time. Initially the research was to be on teachers' attempts to undertake action research activities. This had to change with the realisation that the teachers may not be able to engage with research at that level, and that we (the facilitators, including myself) had to change expectations to teachers undertaking research themselves and what can be learned from that. During the period when I didn't have research questions, I felt confused and direction-less. I did not feel like I had started doing research yet, because I had not yet gone out to schools to observe teachers. It was only after I drafted the questionnaire that I realised the amount of data I already had. Drafting the tools myself rather than looking for somebody else's tools helped me to re-focus and clarify my research. It also permitted the flexibility to allow questions to change depending on the situation.

The process of developing tools was not easy, I lacked confidence in my capacity to draw useful tools. I was uncertain about the questions and needed reassurance on this. In some cases the confusion and the uncertainty arose because while asking the questions, I was also trying to answer the questions myself, because I was a participant and wanted to see how the other teachers would respond and compare with my responses. At some stage, I was uncertain of the questions and felt like I had not thought of all the important questions. I was also sub-consciously reverting back to theory. For instance I was also

thinking in terms of what is supposed to be the best approach to learning and teaching. I also needed guidance on how to use the tools, the timing and the combination of strategies.

The difficulty in settling with one specific topic also stems from the qualitative nature of the research that I was engaged in. I was not carrying out a survey of one issue, it was not research testing a specific hypothesis, it was an enquiry into complex and multi-faceted issues, and the information on these issues did not come about in a straight forward manner. The information from the different teachers also didn't come about at the same time. This meant that I had to be looking out for different types of information at all times. The process was not linear where I could go over one stage and complete it. The different factors that played a role in what teachers were doing and not doing also manifested themselves in different ways. Doing this king of research required a level of flexibility that I did not possess and this was frustrating.

When asking questions, sometimes I got straight answers to the question, but sometimes the teacher provided a different type of information which to them was more important than the question I was asking. This meant that data analysis was a process of looking for answers from the data and also a process of looking for questions from the data that were being answered by the information provided. The process was therefore very complex and difficult. Part of the problem was that I, and the other participants who experienced problems with narrowing their topics down, kept trying to identify and use pre-determined sets of guiding questions in a situation that was probably generating a different set of issues. For instance, in the initial stages, all participants expressed wishes to see teachers doing research, while the major need was to really determine the sets of values and beliefs that place teachers in a position to either engage in research or hinder them from doing research.

The perceptions of research that I had differed significantly from what I found myself doing. Observation meant going to a school with pre-determined things to observe,

looking out for those specific things and keeping records of them. However in participant observation, I could not have very specific and fixed questions all the time. I had to follow the flow of activities and be led on by the way events were unfolding, any attempts to come with predetermined questions and issues tended to change the atmosphere, and thus, the data that would have resulted from it. Instead I got information first and then went back afterwards to find out what questions were being answered by the information. This was a reversal of my expectations of how research is done.

CHAPTER FIVE

EMERGING ISSUES AND DISCUSSION

5.1 Introduction

Somekh (1993) notes that the impact of research knowledge upon practice is rooted in the ability of the individual professional to change what they do and how they think. Thus for research, whether it is traditional research or teacher-based research, to have any significant transformatory impact on the practice of teachers, the teachers need to be able to undergo changes in the way they presently carry out their duties and how they think. The professional development of teachers through research is thus similarly dependent on these abilities and the willingness of teachers to undergo the changes. Change is not an easy process and is constrained by several types of barriers.

This chapter provides an overview and discussion of issues emerging from the study about teachers, teachers and research, as well as teachers and outsider-led projects. The barriers and constraints posed by research and the researcher's role in a context of an outsider-led project are discussed. Although, the researcher is not necessarily approaching the educational issues involved in this study from the same theoretical perspective as Dalin (1978), his classification of the constraints that can be encountered by those involved in change processes was found useful. The constraints identified from this study are thus grouped under the terms; power barriers, value barriers, psychological barriers and practical barriers. The discussion draws out challenges posed by such activities for teachers and for other people who initiate or facilitate teachers as they attempt to become researchers and generally engage in activities that make them change agents. As part of this discussion, attempts are made to draw out some of the processes that seem to be important for enabling teachers to become researchers, as well as some of the changes that the teachers need to undergo.

5.2 Power barriers

Power barriers emerge in situations which involve the re-distribution of power. Power issues played a significant role in this research and the project as a whole. One of the greatest barriers was that the teachers operated within fixed power structures and tended to conform rather than challenge these structures. They also perceived knowledge as justification for power and this had an impact on their interactions with other adults in the projects, as well as their interactions with students. There were issues emerging from the fact that the project was initiated outside the school and not by teachers, issues relating to the partnership and collaborative approach advocated by the organisers, issues about hierarchies between educational institutions and the people who work in them.

In a comparison of the IPEB project with its Zanzibar precursor, Lange (1996) notes that the IPEB project presented issues of "Who owns this?' and "for what purpose do they want us here?" in ways which did not come about in the Zanzibar experience. The difference resulted from the fact that the Zanzibar project emerged from within the education system itself and from the workers in the system, while in the IPEB project the workers from the system were invited. The fact that the project was externally initiated created expectations that it was a similar exercise to traditional INSET in which teachers are invited to play pre-defined roles and to fit into existing structures. The majority of the teachers therefore found it unusual that they were expected to assume co-ownership. They lacked experience of that nature and many of them opted to remain outside the decision-making processes in the project. By remaining fixed in expectations created by prior experience, they limited opportunities for learning and developing in a different manner from what they already knew. This experience also suggests that new approaches that are unfamiliar to teachers may alienate them from the very activities from which they are supposed to benefit.

The teachers operated within a framework of hierarchies which placed the organisers of the project at the top, and considered them as experts who know everything about the

project. They on the other hand positioned themselves in a middle position which required them to be receivers of information and implementors of the organisers' planned programme, as well as, conveyers of information and instructions to students. They did not expect to participate as equals or to assume any responsibilities other than implementation. The expectation of the organisers on the other hand was that the project would assume a participatory nature, be a collaborative effort and a partnership between IPEB and the other participants. Adopting a collaborative stance represented an attempt to reject an orientation that portrays INSET providers as experts who impart knowledge to others. Collaboration implies collective ownership and collective responsibility for developments in the project. It implies democratic interaction between participants based on mutual respect and equality. For most of the teachers, the anticipated collaboration and partnership did not develop. Their prior experience again dictated that they rely on what has come to be the tradition; power structures that make teachers technicians who implement other people's ideas.

Another problem is possibly that there were no mechanisms explicitly set to sufficiently encourage such development of partnership and shared ownership. It may also be that there were no incentives considered satisfactory by teachers to enable them to play leadership roles in the project. The point of such leadership roles may not have been obvious to the teachers (Lange, 1996). Developing shared ownership needed time to happen, and it needed the development of a team atmosphere to be a major focus. One of the major constraints was that the research team was built of people who hardly knew each other, people who needed time to relax around each other, but who never lasted long enough in the project to build that kind of relationship.

The fact that the institution within which the project was located was identified with the university and that both the IPEB facilitator and myself as organisers, were associated with the university contributed to the difficulties experienced regarding collaboration. The traditional relationship between universities and schools and between the people who work in these institutions is a consequence of positivist traditions that promote a

hierarchical view of the relationship between theory and practice, between institutions that are theoretically oriented and those more practically inclined, and between university educators and school teachers. It is also a result of the unproblematic treatment of the possession of certain kinds of knowledge as justification for inequalities between those regarded as experts and others who lack such expertise.

Connelly and Clandinin (1994) note that the potential of a collaboration between teachers and university-based educators is a complex function of the participating parties, their intentions, and their particular political context. These authors further note that the nature of the political context in the case of universities and schools, is one where the university is a place of knowledge and reflection and the school is a place of action. It is a context in which university-based people are experts. Their expert knowledge comes from research and with the expert knowledge comes authority. The authors further describe this context as one in which, teachers are most often seen as people with routine practices, and who have less knowledge than university teachers. Schools provide research sites for the university, and teachers and children are research subjects. The important point that the two authors make is that this kind of thinking does not just happen in the university but is held by teachers as well. The findings of this research suggest that this kind of thinking is so entrenched that teachers have come to regard it as a norm to which they should conform.

One result of the hierarchical relationship between these institutions is that teachers constantly assess themselves against educators associated with tertiary institutions. The teachers in the study reported here regarded themselves as deficient and did not believe they were confident enough to engage in activities they associate with universities. A result of the low self-image is that teachers de-value their own work and their own ideas. They then become dependent on other people, thus perpetuating their own powerlessness and further entrenching traditions that limit their participation in educational acts to technicist roles.

My own experience from facilitating some of the teachers' research attempts in this project was that, because I was associated with the university and because I was a post-graduate student I was expected to be an expert in research and how research is done. There was a tendency to look to me for direction, despite my repeated explanations that I was just as new in research and also learning about research in the same way that the other teachers were. Suggestions I made about research were treated as solutions. I had to continuously monitor the way I was interacting with the teachers and had to reflect on the interactions in an attempt to eradicate behaviours and actions which might have been promoting such dependence.

It is important to recognise that the teachers' lack of confidence in their ability to become researchers, is not just a result of lack of appropriate skills. It is also an issue of research as a status game. It is about power relations between schools and universities and between teachers and university-based educators. Introducing the concept of teachers as researchers is, therefore, not just an introduction of a new strategy but a challenge for teachers to approach the relationship between schools and universities and the activities associated with these institutions differently. Organisers and facilitators of such endeavours need to take this into account. The experience from this research was that, to engage in research, the teachers needed to re-think and change their perceptions of the relationship between themselves and the people they considered as experts, and whom they believed to be the rightful holders of the researcher title.

The challenge for facilitators is to help create awareness amongst teachers about the extent to which treating the biased and unequal relationship as a norm is actually constraining their own development towards becoming researchers. It is important that collaborative approaches between teachers and people associated with universities explore ways of assisting teachers to develop and maintain a high regard for their own work and their own ideas. Furthermore, facilitators should be engaged in research that monitors their own interactions with teachers in order to establish factors in the interaction which

promote inequalities. Facilitators need to make a conscious effort to eradicate ideas and practices that reinforce inequalities.

In a discussion of another collaborative effort between outsiders and teachers, Stenhouse (1975) indicates that the organisers are expected to tell teachers what to do rather than to invite them to undertake research. The teachers tend to depend on the outsiders as experts, and as the authority on whether teachers are doing the project or the research correctly. Stenhouse (1975), provides examples from two teachers who describe the situation as follows,

> I do not think that at any stage during the first months with the project did we feel that we had either the authority or any of the basic skills to research into our own teaching practices (160)

and

> no matter how often the central team attempted to reject the dependence and to re-iterate the statement about being partners in the development of the project, we in the schools did not accept this, we could not believe that the central team were really in this position and that they really didn't have answers to our never ending classroom problems...as teachers we expected to come to the fountain head and to receive reassurance
>
> (160).

The experiences from IPEB and the reflections from Stenhouse suggest that it is important to consciously expose and deal with the complex power issues in the relationship. Such initiatives for collaboration need to have built into their organisation, mechanisms that enable participants to seriously problematise the relationship between the possession of knowledge or expertise and power. Another challenge is to seriously examine the extent to which it is possible to create equal partnerships between educators based in tertiary institutions and teachers, in a context where teachers qualify into the profession through training provided by tertiary level educators. To achieve transformation rather than just an

overhaul of existing practices, such deliberation should culminate in participants launching programmes for reformulating institutionalised power structures, and moving beyond transforming negative effects of power imbalances into positive ones (Ellsworth, 1989).

Another important issue relates to the power structures that teachers expected and adhered to in interactions between themselves and the students. In situations involving teachers and pupils, the teachers adopted managerial and authority positions. They strongly believed in prior possession of knowledge and perceived this as justification for privilege and power. They were also highly conscious of knowledge as the criteria used to differentiate between themselves and their students and wanted this status to be maintained rather than challenged. They were more comfortable when acting in ways which reinforce this pattern of power distribution. Their rigid adherence to power structures limited their research activities and limited the nature of their learning from their interactions with students.

Their assumption of learning was that it is a direct result of teaching and that the teacher is an authority who can determine the nature, the pace and the direction of learning activities. They also assumed that students acquire knowledge when teachers impart their own knowledge to them and that this learning occurs only in formalised settings. Another implicit assumption is that order and structure are equivalent to learning, hence their insistence on control and structure. These assumptions are problematic for exercises meant to built reflective and critical cultures. When teachers are inflexible about power distribution patterns between themselves and their students, the ways in which the two parties can interact become limited to those that maintain existing hierarchies. This also limits the extent to which teachers and students can engage together in knowledge production processes. The teachers' insistence on adhering to set structure limits the extent to which they can become 'liberating educators'. Their authority becomes fixed at an unchanging distance from students and the authority thus denies the freedom of students. The teachers cease to be authorities and become authoritarian (Freire & Shor, 1987).

5.3 Value barriers

Another area of difficulty in the change process involves values. The values of those who propose change, those who initiate change and those who implement change may act as barriers to change. Value barriers to change exist in situations where the proposed change is based on a different set of beliefs and ideologies to those held by the participants in the change processes. The differences in beliefs and ideologies result in very different interpretations of ideas for change and change processes. Somekh, (1993) points out that one of the major problems of change for individuals is the change in values. This is a result of the fact that "people's self-images are strongly bound up with their values and beliefs and their attachment to them is highly emotional" (p35). Furthermore, the values and beliefs are often only partly conscious and explicit. This implies that the teachers themselves may not recognise their significance and their impact on their thoughts and actions. Unless these values are seriously challenged and exposed to scrutiny, changes may not necessarily result in either professional development or empowerment (Somekh, 1993). Day (1993) points out that, it is only when teachers are enabled to engage in reflection and action which incorporates the teacher as a person, including his cultural values, that teachers will be truly empowered.

The process of change inevitably implies movement from what is familiar to something else. It thus causes uncertainty. It may mark a marked difference from existing structures which individuals have created to ensure understanding and prediction of events in their lives. In professional development, the change may involve movement from a former routine way of acting and teaching in the classroom. Change may also lead to loss of status or a changed relationship with pupils. The challenge for facilitation of activities aimed at encouraging professional development of teachers and empowering them to become researchers, is therefore to develop environments in which the reflection and scrutiny of values can occur in a non-threatening manner.

The teachers held views of change that differed in significant ways from change advocated by proponents of teacher research. While teacher-researchers are supposed to be change agents who play a central role in the design, implementation and evaluation of change processes in their classrooms, the teachers in this study viewed change as a top-down activity in which their role is confined to implementation. They viewed change as originating outside the school, designed by experts in higher structures of the education system and communicated down to teachers for implementation. Because of this perception, the teachers could not initiate change processes, instead they waited for other people to initiate change. Even when they were already engaged in change processes, they expected their role in it to be externally defined. Their perception limited their flexibility and ability to make spontaneous decisions about what change is necessary and what methods are best for achieving the desired change.

Their perceptions are also an indication of the extent to which the positivist ideas and practices of separation of roles has permeated the teaching arena. Top-down approaches that make teachers technicians have become logical norms that teachers work towards. The teachers were therefore not ready to operate at the level of those who consciously seek their professional autonomy and utilise research as a tool for achieving such autonomy, even if it is partially and happens only in the classroom or the school. One of the important processes that they have to go through is that they should realise fully the implication of adhering to traditional approaches to the role of teachers in educational change. They should seek to change it and want to play a central role in the change processes, especially in research.

Another lesson from this experience for initiatives aimed at providing teachers with alternatives to educational change is that such activities will have to start at the level at which the teachers are operating. For facilitators, this may mean having to first enable teachers to realise problems inherent in hierarchical divisions of labour and their divisive strategies. To understand the need for autonomy and empowerment, and to be involved in action that deliberately seeks to achieve these ideals would require them to first recognise

the ways in which their perceptions undermine their own professional autonomy and in fact disempower them. Such an endeavour may take a long time and some teachers may not agree with the proposed changes.

The challenge posed by this perception for teacher-based change processes is therefore that, initial stages should be geared towards assisting teachers to develop an understanding of the fundamental differences and implications in perceiving teachers as change agents instead of mere implementors of other peoples' ideas. Thus enlightenment about the ways in which teachers' assumptions of their roles in change serve to enforce their powerlessness in decisions about their profession, should form part of the agenda for teacher research initiatives.

The articulation of these values and their exposure to public scrutiny may not be an easy process. However, Schratz, (1993) argues that such articulation of personal beliefs and practical theories makes them susceptible to change. He warns however that the process may be complicated by the fact that teachers have been socialised into traditional methods over long periods of time, and changing from this is not easy. Furthermore, even if these theories are challenged, changing practice usually involves a long process of changing one's pedagogical habits which have proved to work according to one's own belief system.

Clark (1992), suggests that change is easier and more likely to succeed when participants in it feel that they own it. He argues that such ownership of change enables them to realise full value from it. He points out that the question that educators should be concerned with is not whether teachers have what it takes to be designers of their own professional development. The question is how educators can help them with the process. Clark's question poses a challenge for facilitators of teacher development to help teachers break away from their traditional perceptions of change as top-down and as outside their control. The experience of this research has indicated that volunteering for change does not guarantee that teachers will want to be in control of the change process. Facilitators of

change need to be aware that due to lack of experience in such situations, teachers may not see the need for being in control of the change processes, and they may not see the point of the advocated changes. For facilitators attempting to create awareness about the importance of teachers' leadership in educational change processes, the challenge is to do this in a manner that does not reinforce inequalities which may operate in situations where people approach processes of change from different perspectives, and where one party is attempting to enlighten the other about the problems inherent in the perspective within which they are located.

The project was informed by views that regard knowledge generation as a social process and teacher education as an outcome of interactions between teachers and children. This interaction involves moments of reflection on attitudes, assumptions and beliefs about teaching and learning. The camp was therefore created to be an environment where teachers can learn something about their attitudes and perceptions about learning, about children and about the interaction between teachers and children in learning situations. The teachers' perception on the other hand was that their own learning needs to happen separately from that of the children. Their view of knowledge was therefore that it is an objective entity that is acquired by teachers in specialised sessions before it can be transferred to children. Their view represented a clash between theories that inform teacher research which regard knowledge as a result of negotiation and deliberation between learners and teachers. It was not easy for them to understand knowledge as socially constructed, especially by them and students together. They interpreted it as a challenge to their status. They felt more secure with familiar practices that separate their learning from that of their students. They were therefore unable to utilise the project fully as a learning experience about themselves and their practice. Situations that could have served as professional development moments and which challenged these values were found uncomfortable and in some instances rejected. They created anxieties, alienation and sometimes complete withdrawal from the project or the activities.

The teachers' views of how teaching and learning situations should be organised imposed constraints on the development of critical and reflective attitudes and acted as a barrier to self-directed professional development. The barriers could be seen in the different ways in which the teachers and the children tackled learning activities. While the children did not operate under any structure, and engaged in activities in a flexible and exploratory manner, the teachers felt frustrated when events did not progress according to the structure they had envisaged. Instead of meeting the teacher research ideal of using interactions between teachers and children as learning opportunities and professional development opportunities, the teachers insisted that their own learning should happen away from students and should precede teachers interaction with students.

Their views of learning and conditions that serve as opportunities for learning were fundamentally different from the views of knowledge production as a social process and a product of negotiation between teachers and learners inherent in the practically oriented or critically inclined views of learning and knowledge production. The teachers were in a different orientation from that of Freire which sees teachers as both educators and learners and learners as both learners and educators (Freire & Shor, 1987). In the theories informing the teacher-as researcher approach, learning is regarded as a two-way process, where both teachers and learners learn from each other, as they engage in activities together (Lytle & Cochrane-Smith, 1994). In this view, learning is a continuous process and is not confined to certain stages of the development of an individual. Development is itself continuous. For these teachers, becoming researchers required changing in very fundamental ways their epistemologies and their understanding of authority and how authority differs from authoritarianism.

The teachers' descriptions of research indicate a view of research located in the applied scientific paradigm (Popkewitz, 1984). Their perception of research as a process done on other people, a theoretical and abstract activity that requires specialised techniques was markedly different from the approach of the organisers to research. This approach makes research serve a very instrumental purpose and orientates it towards technical interests of

control and manipulation. The IPEB project was introducing a completely new concept, a new approach to research and a new approach to the role of the researcher in the setting under study. It was an approach that treats the researcher as part and parcel of the social setting, a participant in the setting who is another source of information. An issue emerging from this perception and a challenge for facilitators of research is the need to create an awareness of the differences between research that serves traditional technicist purposes and research that liberates both the teacher and the learners from technicist practices and their manipulative orientations. This is a major challenge, as it involves a reorientation of teachers in terms of the ways in which all tendencies towards control ultimately make the teachers themselves subjects of control and disempower them.

The changes reported by the teachers at the end of the project suggest that support structures and mechanisms aimed at enabling teachers to become researchers into their own practice should necessarily include situations in which teachers decide for themselves what areas of research are of most interest to them. Such situations should be flexible and enable teachers to change their minds about the things they want to research. Most importantly, they should be conducive for teachers' reflection on the factors that result in their low self-image. The environments should challenge teachers to engage in activities that boost their morale and enable them to take risks which will ultimately result in their personal and professional growth.

One of the fundamental ideas underlying action research and teacher research is that teachers should plan their own research, carry out the research and evaluate it themselves (Carr & Kemmis, 1986). These processes require them to be in possession of reflective skills and an ability to engage in critical analysis. The teachers in this study did not possess these skills and found situations that challenged them to develop such skills difficult and frustrating. Davidoff (1993) notes that in South Africa, especially in the case of teachers from underprivileged communities, critical reflection on teaching practice is an exception to the rule. The kind of reflective practice assumed by the ideals of action research is perceived almost on the level of a meta-activity, "one step removed from the daily realities

and needs of classrooms, students and their teachers" (Davidoff, 1993:78). Drawing on Walker, (1992) she indicates that many teachers lack models of quality practice and even technical teaching skills. She therefore argues that in the absence of these basic skills, expectation for reflective practice may be unrealistically demanding for the teachers.

In response to these constraints and the challenges posed by them, she suggests that it is crucial for those facilitating teacher research activities to start where the teachers are. This starting point may not necessarily be "located in a tradition of innovative and reflective practice" (Davidoff, 1993:80). She suggests that in order to facilitate the more fundamental paradigm shifts, it is necessary to begin by asking critical questions which can highlight broader social concerns, but which are reflected in the microcosm of the classroom.

The teachers' recommendation for dealing with the lack of experience and lack of research skills was that they should be provided with training, prior to engaging in research. This training was expected to take place in formal settings specifically designed for that purpose. While it is acknowledged that plunging teachers into an unknown territory without preparing them is counterproductive, the view of training in which learning happens prior to activities and where learning happens only in formal settings needs to be problematised. Throughout a teacher's life, he/she receives training of some kind, be it pre-service training that qualifies them as teachers, or in-service training that keeps them up to date with current developments. The common quality of these types of training is that, somebody, who is an expert in a specific field, is trying to impart knowledge to teachers. In most cases, teachers are involved in the exercise as people who are being taught, rather than people who are teaching themselves things through discovery, through inquiry and by struggling with the implications of the concept in action. Since the learning is not in the control of the teachers, they can only learn certain things that are presented in the organised situation, and not others. This always leaves them in need of some kind of training. They are always dependent on somebody to tell them or show them how to do things.

While it is important to assist teachers in some way and equip them to engage in research, it is equally important that they be empowered to become independent learners. It is important that they become directors of their own professional development. Teacher educators need to deal seriously with questions such as, whether training needs to always happen prior to teaching or whether teaching should be seen as a process of continuos learning. They need to address issues of how facilitation of teacher development can empower teachers to sustain their own learning independently of other people. There is also a need to explore ways in which facilitators can assist teachers to adopt experimental approaches, become reflective practitioners and train themselves as they carry out their daily duties, in their own specific contexts, and in the presence of children.

The processes of research posed their own challenges for the teachers. There were difficulties with narrowing research areas to specific research questions. The teachers struggled with moving from broad thinking to specific ideas or specific aspects of a broad research topic. My own experience was that the process of clarifying research questions is not easy and it may take a long time and that time differs from person to person. It is therefore important that teacher research projects provide enough time for teachers to make the necessary adjustments into a researcher role. Such programmes must be designed such that they accommodate individual differences and provide facilitation that accommodates specific individual needs.

My experience was also that the processes of clarifying research questions or determining a specific focus is directed by one's perceptions and expectations of how research should happen. Similarly, the teachers' perceptions of research as based on some pre-defined hypothesis to be tested limited their thinking of research questions and the focus of such questions. This in turn limited opportunities for exploring other approaches to research and veiled important information that was already emerging from activities that teachers were engaged in. For instance, teachers could have learned more about themselves and how to handle the difficulties they were encountering but their emphasis was elsewhere. It may also be that facilitation was insufficiently responsive to other emerging issues, which

could have led to re-direction and a re-focusing of the project. It might have also been more useful to start the project with an exploration phase in which teachers generate general observations followed by specific research questions. While this idea might have existed, it was not matched by practice.

Another major challenge for the teachers was to engage in research activities when they did not consider themselves researchers. They believed that they did not match their perception of what a researcher is and that they did not possess the necessary abilities for the role. Research has in the past not been a major emphasis in teacher training, especially pre-service training. The researcher role has not been integrated into the traditional definition of a teacher. Therefore doing research is considered as a specialised activity that employs specialised techniques. Even in cases where teachers are involved in observations in their classrooms the conception that research requires specialised techniques makes it difficult for them to recognise their classroom activities as research processes. Becoming a researcher required a willingness to take a risk and venture into an unknown territory. Without the willingness to try and the willingness to learn from experience, the transition from a traditional teacher to a teacher-researcher may not happen.

This raises a number of challenges for the facilitators. Firstly, facilitation has to work with teachers to explore ways in which teachers can link the researcher and teacher roles, so that they do not have to be either teachers or researchers, but teacher-researchers. Secondly, there is need to explore ways in which research can be linked to teaching, hopefully to approach teaching as a continuous process of research and research as a way of teaching. Seeing the two concepts as descriptions of the same concept would deal with the perception of a teacher and researcher as separate people with one operating inside the classroom while the other directs classroom activities from outside. It would also solve the problem of time as inadequate for both activities. The teachers' research efforts also need to be made part of recognised activities for appraisal and be rewarded accordingly.

Amabile and Stubbs (1982) recommend to teachers that they should think of themselves as researchers and realise that much of what they do in their daily practice bears a great deal of similarity to the scientific research enterprise. These authors point out that teachers can best achieve the transition to a researcher role if they see themselves as potential initiators of investigations. Allwright, (1993) suggests a concept that he calls "Exploratory Teaching and Learning" as one way of integrating research and pedagogy. This concept employs classroom procedures that teachers are familiar with as techniques for research. Allwright's argument is that teachers already know and trust these classroom procedures and they can exploit them for investigative as well as narrowly pedagogic purposes. Some examples of these classroom procedures that have been used successfully by teachers he worked with are; group and pair work discussions, surveys, interviews, simulations, role plays and role exchanging, diaries and dialogue journal writing, projects, poster sessions and learner to learner correspondence. The experience from the research reported here is that teachers need assistance to develop a different perception of research altogether in order to recognise these familiar classroom activities as research techniques.

5.4 Psychological barriers

Psychological barriers occur as resistance to change in situations where people feel challenged to leave the security of what is known to them and adventure into new territories. Dalin(1978) notes that the normal tendency is for people to continue with activities that are known to them, which provide a certain security, rather than enter into activities with unknown consequences. There were several things about the project that resulted in psychological barriers. The project was introducing new approaches to a lot of things that teachers had come to take for granted. The concept of research was new and assuming a researcher role was like venturing into uncharted seas. The approaches to learning and teaching as well as approaches to professional development were unfamiliar to the teachers. These created insecurities and uncertainty of what the future would bring. The camp atmosphere was an even stranger environment in which nothing was pre-determined and the whole exercise was being developed as people were engaging in it.

Although the teachers later appreciated all these unfamiliar things, being a part of the project was an exercise marked by frustrations, anxieties, insecurities and sometimes highly charged emotional outbursts. The degree to which the teachers learned from the exposure offered by the project was limited mainly by these personal reactions to change and the low self-image that teachers had of themselves. Those teachers who started their research projects, were people who were able to overcome these emotions and change their self-image during the course of the project. They were also the older teachers who had a clear focus of the direction their career should follow.

The teachers indicated in different ways that they were more interested in gaining material things from the project, other than the learning which they recognised as inherent in research. The link they drew between research and professional development was that research should lead to the attainment of certification which in turn would enhance vertical movement on the professional ladder and lead to increased income. In the light of past practice in which appraisal was based on the number of certificates that teachers possessed, it is not surprising that they expected that professional development activities should ultimately lead to certification. Furthermore, the structure of the school has been such that professional movement can only be vertical, with no horizontal movement. Although the focus on payment downplays the importance of learning in the professional activities of the teacher, the call for accreditation is worth attending to.

In another case of perception differences in terms of benefits expected from outsider-led development projects, Leach (1991) describes a study undertaken on technical assistance projects in Sudan in which she identified six major areas of perception gaps between the local staff and the expatriate co-ordinators of the projects. The main source of conflicts was the difference in perceptions of what forms the important benefits of the projects. The co-ordinators were interested in institution building and development of human resources. The local staff on the other hand saw project benefits as material benefits, funding, equipment, books and scholarships. Leach (1991), recommended in that study that the

lack of incentives, and in particular financial incentives, must be considered as a major factor. Leach (1991) further notes that other writers on planned change in developing contexts have shown that attitude and behaviour change seldom occur unless there is a clear perception of the benefits to the individuals. The point here is that, the benefits should be meaningful to the people for whom the change is intended, and not just for the initiators of the change process. In the IPEB project, the issue of what constitutes meaningful benefits was one of the major problems which was unfortunately not articulated openly.

The teachers' concerns with incentives and rewards suggest that it is important that both short term and long term rewards be built into teacher research exercises. One way could be through reconsidering the role of research in the normal roles played by the teacher and making research part of the teaching duties of teachers. Then teacher appraisal could both recognise and reward teachers' research activities through promotions. An emerging trend in South Africa is the linking of professional development activities to tertiary level courses. Perhaps linking teacher research activities to some form of accreditation through an institutionalised course would create motivation for research and address the teachers needs for the research to enhance their chances for promotion.

5.5 Practical barriers

Practical barriers emerged from the way the project was organised and the practical conditions of the teachers' work places. Time, inadequate and unfamiliar support and the way life is organised in schools were cited as some of the major problems for teacher research. Although the researcher acknowledges time as a limitation, the experience from the project was also that, time became an issue because being a teacher and being a researcher were regarded as competing roles, and the teachers were more inclined towards the teacher role. It is important however in a school situation that the organisation of time should enable and support teachers' research efforts. The major problem about support appears to me to be the fact that the way support was offered required the active

involvement of the teachers in the entire research project. This was unfamiliar and was in several cases inappropriately interpreted as insufficient organisation.

The constraints relating to the organisation of school life and the hierarchies in schools suggests that perhaps teacher development activities should focus on more than individual teachers, but should also investigate the different factors in the school context which act as barriers to teacher development and to changed and improved professional activities.

5.6 Summary

In summary, the IPEB experience has highlighted several issues that need to be attended to as a starting point for teacher-research. The study has shown that issues regarding the distribution of power in such endeavours need to be exposed and thoroughly dealt with. The study has also shown that the success of educational change activities, teacher-based curriculum research and self-directed professional development depends largely on the teachers' perceptions of how these processes should happen. It has also emerged from the study that to undergo paradigm shifts that will enable a change from traditional technicist views and practices depends on the teachers' willingness to change and their response to challenging situations.

Another lesson from the study is that teachers need to first overcome psychological factors that prevent them from adopting exploratory and inquiry approaches to teaching and learning and to their own learning. Although teachers may be enthusiastic about research and may undertake their research, the extent to which this research may lead to critical reflection and ultimately both professional and personal growth depends on the extent to which support and facilitation assists them to overcome the barriers to change, especially the value barriers and psychological barriers.

It appears from the study that in order to engage in research activities, the teachers needed to change their perceptions of research, and especially their role in research, vis a vis

people from tertiary institutions. They need to change their self-image and start considering themselves as designers of educational knowledge, and not just implementors. They needed to develop an ability to reflect on themselves, to be self-critical and to be willing to learn continuously. They also needed to develop self-confidence and start valuing their own ideas and their own knowledge.

The issues emerging from the teachers' attempts to become researchers also raise a number of questions for teacher training, both pre-service and in-service. The questions include whether teacher training should continue to remain expert training and continue to separate learning about teaching and the act of teaching. It appears important to engage in studies that will determine the extent to which teacher training promotes inequalities based on perceptions of knowledge as a basis for unchanging authority. It is also important to inquire about the extent to which teacher training empowers teachers to initiate and sustain their own learning during the practice of teaching.

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